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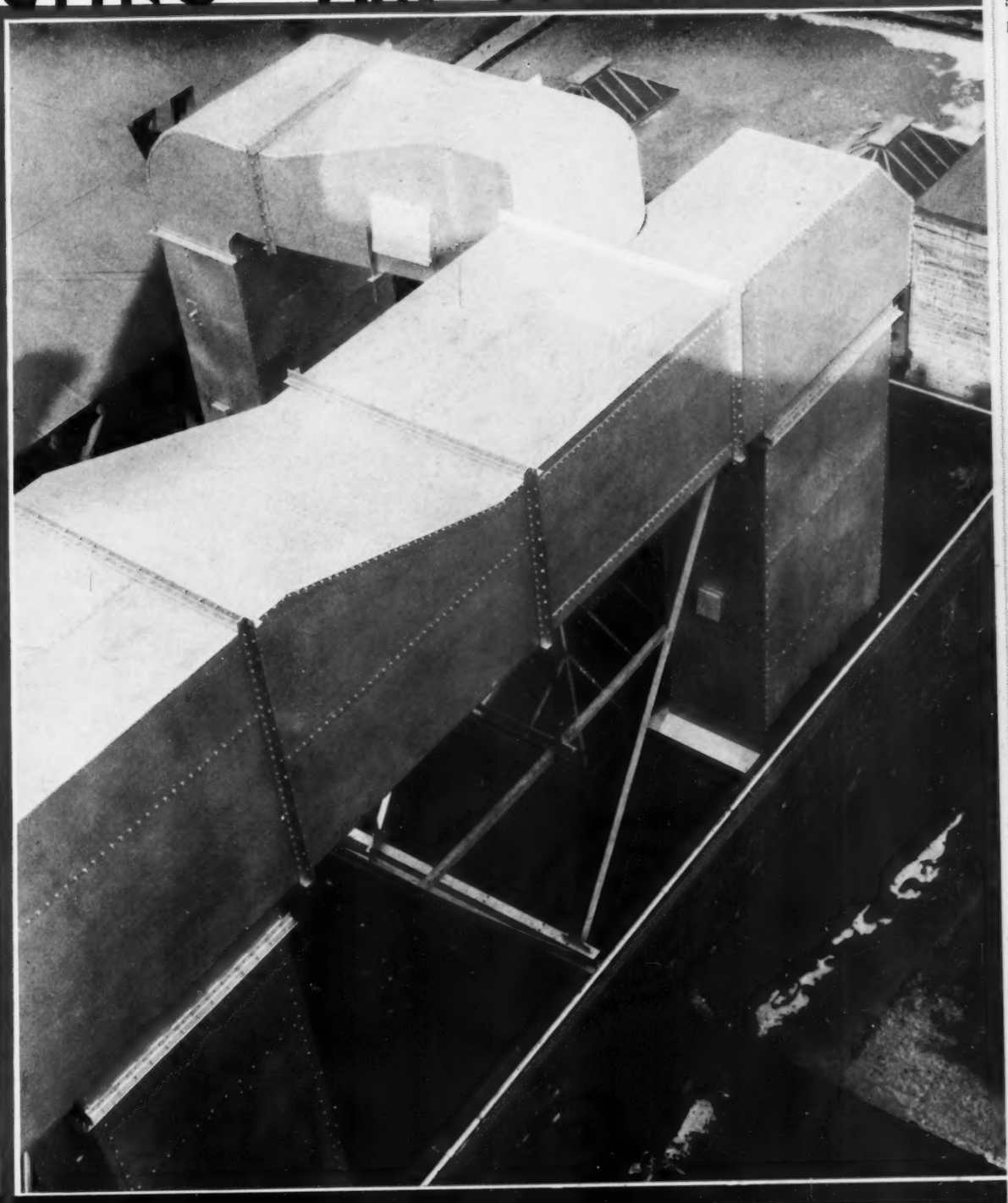

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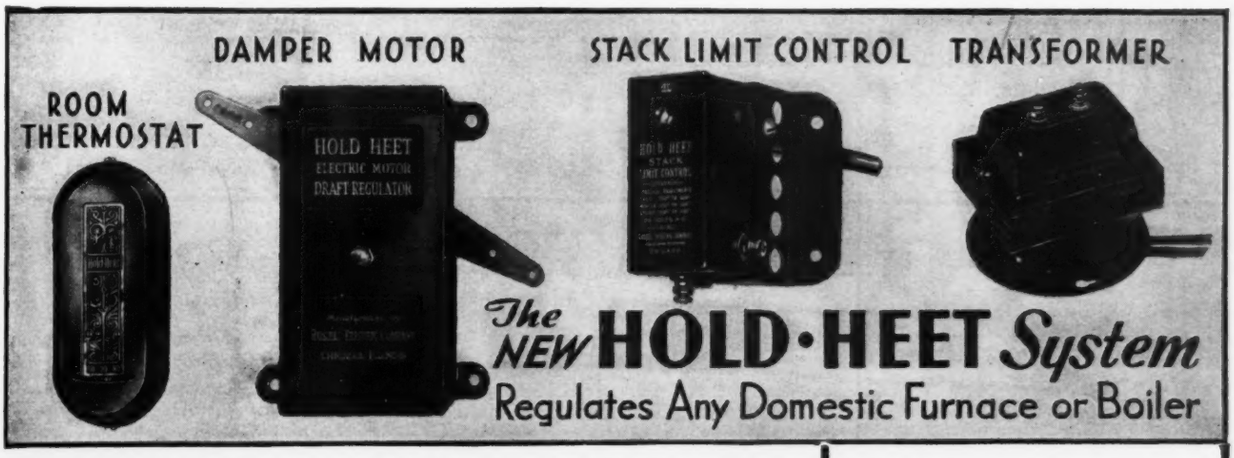

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More than 7,000 copies of this issue are being distributed.

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THIS established fact applies in all lines of business. The product marked with a well and favorably known name, other conditions being equal, is *much easier to sell!*

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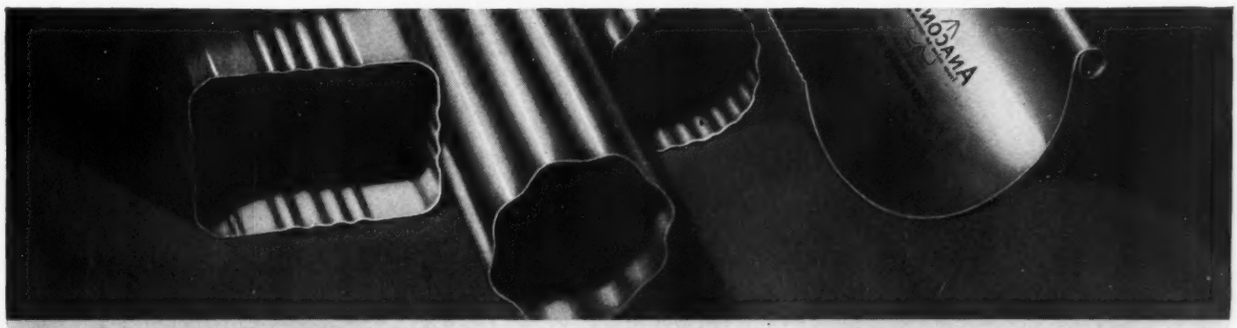

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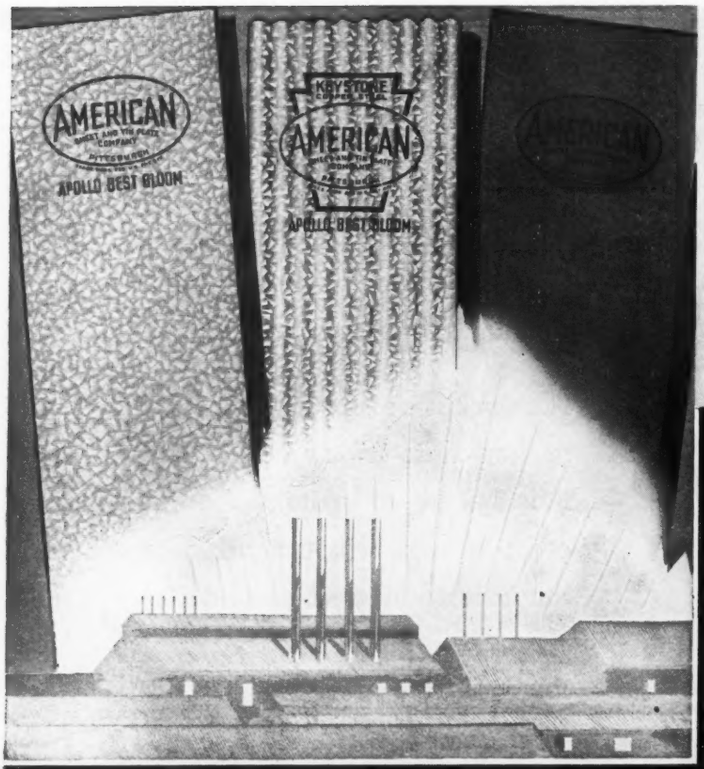

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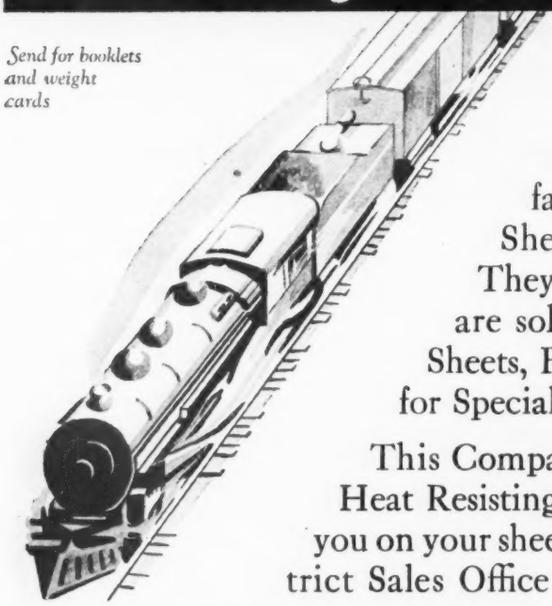

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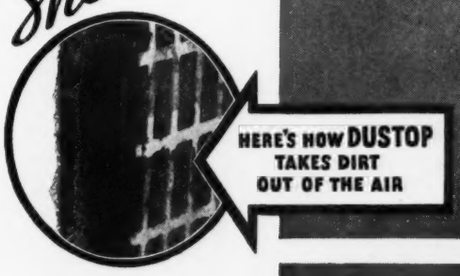

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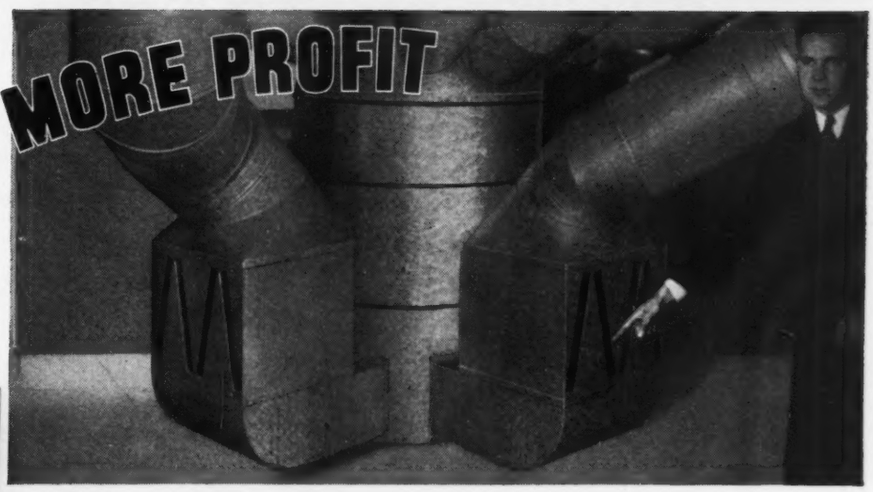

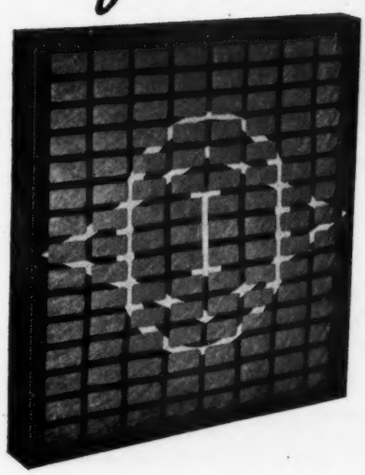

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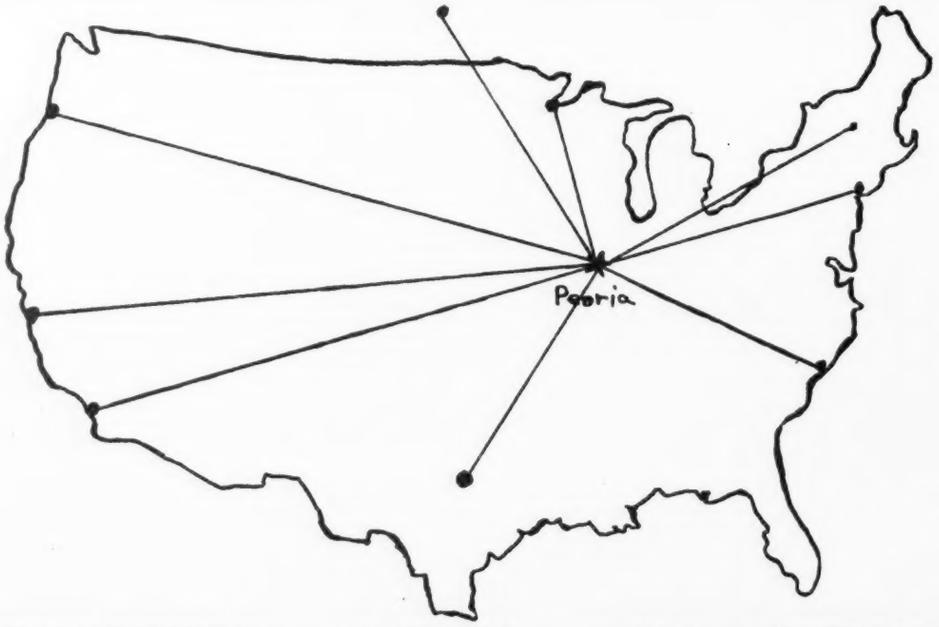

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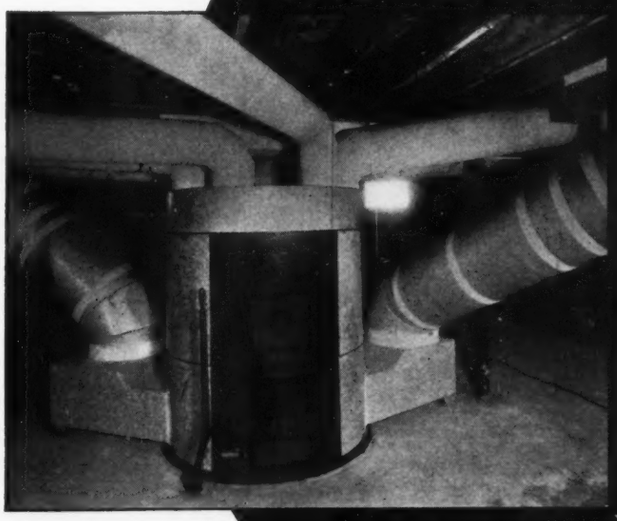
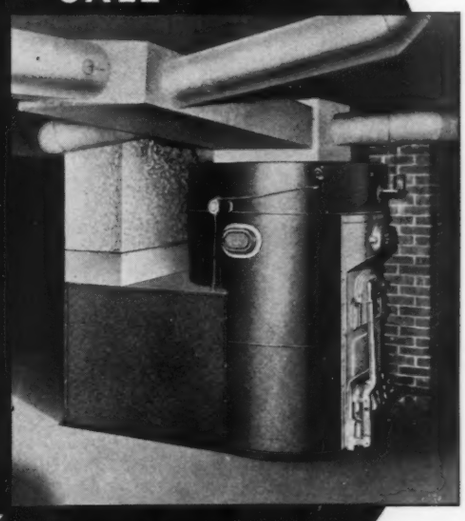


"Before"—The basement showing the gravity furnace installation.

In 1932 A SUNBEAM AIR CONDITIONED SALE . . . .



"After"—The Sunbeam Air Conditioning System replaced the furnace shown at left.

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Your former customers are now prospective buyers of Sunbeam Air Conditioning Systems. No longer is it necessary to wait for them to build a new house requiring a new heating system—or for their present furnace to wear out. Sunbeam Air Conditioning brings them back into the market this year, NOW!

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VOLUME 103 **AMERICAN ARTISAN** NUMBER 5

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

Flash!

The Code of Fair Competition for the Roofing, Sheet Metal and Warm Air Heating Industry was Signed May Tenth and Becomes Effective May Twenty-Fifth

Code Thoughts

Before contractors object to the Roofing & Sheet Metal Contracting Divisional Code or refuse to give it full support, they should study and consider its general purposes for business and trade improvement . . . and note the provisions that allow for alteration and improvement.

In the past business and trade associations have written "Code of Ethics" into their Constitutions and By-Laws . . . specifying that certain enumerated practices were declared to be right, profitable and a protection to all concerned, and all other practices were wrong, destructive or unfair.

The purpose of such codes has been to raise the standards of business and provide protection for the public. . . .

The thing that has been missing in such codes was the power to compel the "sharp" 10 per cent in every business and trade, to be fair, honest and real business men.

Such a power is now given in the NRA Codes.

This Code is a direct challenge to trade to show that it is able to SELF GOVERN itself, to compel adherence to rules and regulations . . . and rid itself of those who deceive and rob the public.

Anyone who objects to one or more sections should first take a broad view of the Code, and then these objections will seem very small indeed when compared with the general good that will result when everyone gives it their full support.

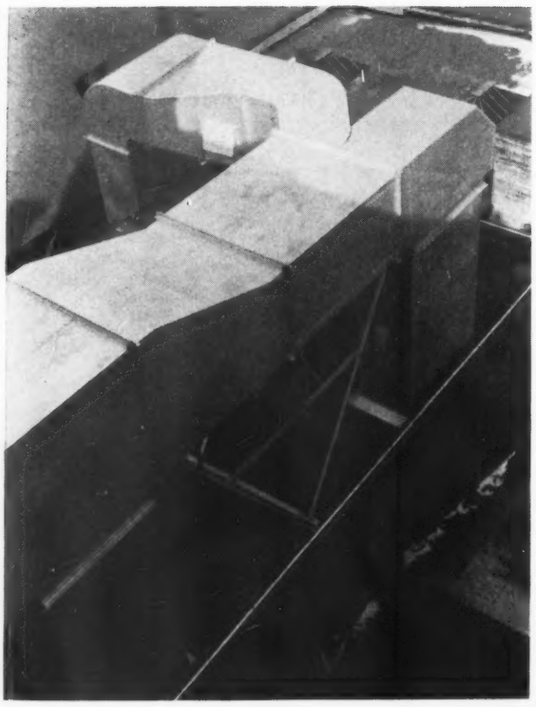
Most of the details of the Roofing & Sheet Metal Divisional Code have been used in the past by honest and responsible contractors and are actually the basic principles upon which any profitable business is conducted.

The Section concerning wages and hours are meant to overcome unemployment and provide a living wage . . . and thus help to increase purchasing power. . . . There has never been a question in the minds of the majority of employers but that their employees were entitled to fair wages. . . . The only reason the wage scale was lowered was because of the severe competition and unfair practices. The Section that prohibits unfair practices and selling below cost will be welcomed.

. . . The entire intent of the Code is to improve, not to destroy. Wherever it is found to work a hardship there is ample opportunity to correct that point. A lot of hard work and much money has already been spent. It will require more hard work on the part of every responsible contractor before the trade can gain the full measure of improvement offered under the Roofing & Sheet Metal Contracting Divisional Code.

Bulletin from the Roofing: Metal and Heating Engineers of Philadelphia.

Effective May 14, American Artisan Will be Located at 6 North Michigan Avenue, Telephone State 6916



Cost Saving Methods Used On Large Exhaust System

By F. A. Westbrook

Fig. 5—Looking down on the lower level horizontal run of duct, showing Y-branch, stiffener angles and transitions.

IN the erection recently of a stack and ventilating duct system, made of 10 gauge sheets, at the plant of the Paragon Paint and Varnish Company at Long Island City, N. Y., the contractor who made the installation cut his labor costs almost in half by making use of hardened, self-tapping screws with hexagonal heads in the assembly of the units.

The contractor, the Philros Sheet Metal Works, had originally intended using rivets for the assembly of the ducts and enclosures, but as the job was figured very closely it was doubtful whether it would show any profit. Comparative tests were made with rivets and the self-tapping screws and it was found that by using the latter a great deal of time could be saved and also that the services of one man could be eliminated. Thus by

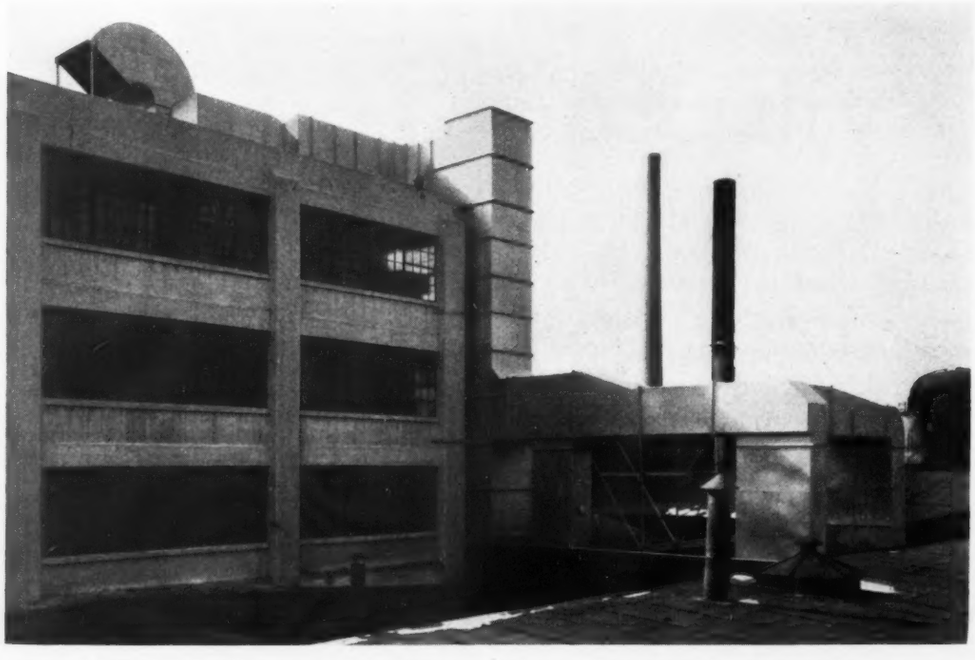


Fig. 6—General view of the duct assembly contrasting the size of the runs and risers with the three-story buildings. The text explains how the sections were fabricated and assembled.

the saving made possible a potential loss was turned into a handsome profit.

The general appearance of the assembled system is shown by the photographs which give closeups of the exhaust end on the roof, the three-story riser and the horizontal collecting system across the roof of the lower section. These photographs also show that the ducts were made of the heavy sheets assembled on angle iron framing, which framing divides the assembly into convenient sections for handling and erection.

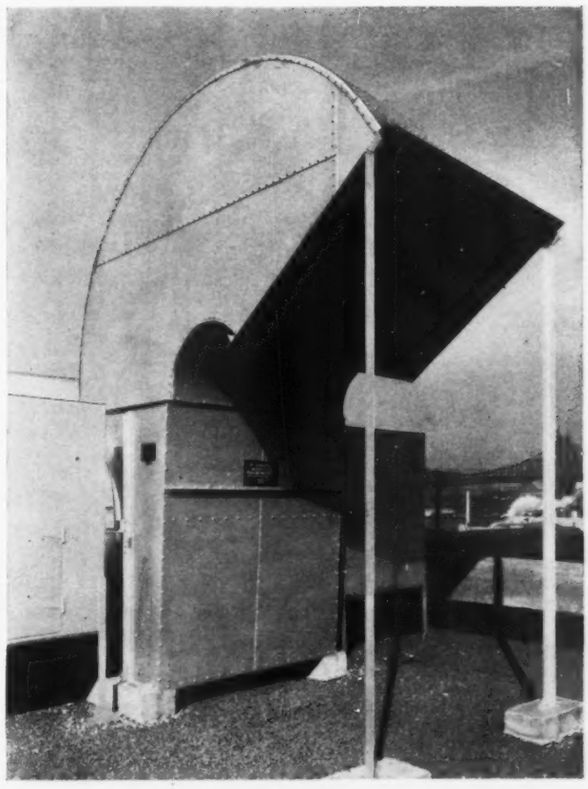


Fig. 7 — Closeup of the exhaust end of the system showing general layout of sheets and sections and housings over apparatus. The picture indicates how sheets were quickly assembled by designing all connections for field erection.

Preparing Sheets

Because of the heavy gauges used, it was necessary to lay out and punch all sheets for starting holes for the screws. The holes in the sheets were all punched in the Philros shop. The same punching procedure was used for the angle iron framing. At least 95 per cent of the holes in both sheets and angles were laid out and punched in the shop. The punched sheets and angles were then temporarily assembled piece by piece in the shop and marked so that coinciding units could be re-assembled on the job just as structural steel is laid out for erection.

Fig. 4—The workman is driving in the self tapping screws with a brace having a special socket end. Holes were shop punched in sheets and angles and lined up so that field erection consisted simply of drawing up the screws.

This method made it possible for the contractor to erect the housing with a crew of three mechanics. The erecting procedure was for the mechanics to assemble a section of sheets and angles on the roof, joining all four sides to make a box. A jib boom was then used to hoist the section into place where a temporary connection was made with bolts and nuts. When the section was finally spotted and bolted into position final assembly was made with the self tapping screws.

Erecting Risers

In erecting the three story riser, the box sections were assembled as units and hoisted by a boom on the high roof. Temporary bolt assembly was first made and then final assembly was made with screws.

The contractor used the hexagonal headed self-tapping cap screws in the same manner as the standard self-tapping sheet metal screws, except that instead of using a screw driver—a socket wrench, either hand or power operated was employed.

The photograph reproduced in Fig. 4 shows how the cap screws were applied on the job in question by a workman with a brace type socket wrench. On this particular job about 10,000 of the ⅜ inch by ¾ inch and ⅜ inch by 1 inch screws were used.

Figs. 5 and 6 show views of the installation and give a good idea of the size of the work. Fig. 7 shows the exhaust end of ventilating system with the cap screws easily discernible. It should be noted that the sheets forming a single section are fastened by lapping the joints. Where different sections are fastened together there are 3/16 inch angle iron reinforcements.

AMERICAN ARTISAN DATA SHEETS

A Chart Method For Designing Roof Drainage Systems*

THE design of the various portions of a drainage system as far as capacity is concerned is dependent upon the amount of water to be handled. This in turn depends upon the rainfall in the particular locality and the amount of roof area tributary to the unit in question.

The roof area used in any computation should be the actual area and *not* the horizontal projection of the area.

The rainfall data to be used in the design should, naturally, apply to the locality in which the structure is to be located. The type of structure for which the drainage system is being designed also should be considered. A storm of maximum intensity may occur only once in twenty or thirty years in a certain locality, while a lower rainfall intensity will be exceeded only once in ten years. If gutter overflow is a matter of inconvenience only, or if the design can incorporate auxiliary drains to care for the excess, the lower intensity may well be used for sake of economy. In residential construction, for instance, no great harm may result if water spills over the outside of gutters during one storm in five years, and the use of the corresponding intensity of rainfall rather than one which will never be exceeded may result in considerable saving.

Rainfall Data

The U. S. Department of Labor has compiled charts for 23 cities throughout the country. These records were used unadjusted in compiling the table in Fig. 130.

In the design of leaders, it should be realized that practical considerations enter as well as principles of hydraulics. It is obvious that more water will drop through a vertical pipe than will flow in a horizontal trough of equal area. Therefore it might appear that the leader could well be much smaller than the gutter and still take care of all the water coming to it from the gutter; moreover, it might seem that the leader can be tapered in size as the velocity of the falling water increases with the drop. These inferences would follow if only pure hydraulics were involved.

Experience has shown, however, that due to practical considerations the following principles should be followed:

(a) 3″ round or 1¾″x2¼″ rectangular leaders should be the minimum (except for small porches).

(b) Leader area should be constant throughout its length.

(c) 75′ maximum spacing recommended.

With item (c) in mind, the locations of the leaders are first determined. If possible, they should be placed near the corners of the building so that the gutter water will not be required to flow far beyond a sharp turn.

Roof Areas

With the locations determined, the areas tributary to each leader should be computed. Actual roof areas should be used, and not plan areas. These areas will then be divided by the proper factor selected from the table in Fig. 130 and the required areas of the leaders thus determined. By then consulting Fig. 131, which gives the areas of various standard leader sizes, the proper leaders of the desired type can be ascertained.

Fig. 130 gives the intensity of rainfall which would be expected to occur in twenty-three cities according to U. S. Weather Bureau records, and the corresponding amount of roof area which one square inch of leader area will drain during such storms. The latter are based on the common assumption that for an intensity of eight inches per hour, one sq. in. of leader will care for 150 sq. ft. of roof.

Example:

Suppose the problem is to design the leaders for a building in Boston which is to be 120 ft. by 80 ft. with a plain gable roof having a ridge down the center and a slope of 9″ to the foot. Assume further that there will be a leader at each corner and that it seems proper to allow for one overflow in ten years.

Solution:

If the slope is 9″ per ft., the roof area on each side of the ridge is 120′ by 50′, or 6000 sq. ft., and each leader would serve 3000 sq. ft.

From Column "B" of Fig. 130, opposite Boston, it is found that 200 sq. ft. is the amount of roof area which 1 sq. in. of leader will serve, and accordingly a leader having an area of 15 sq. in. is required.

Now from Fig. 131 it is found that 5″ round or octagonal leaders are required, or that either 3¾″ x 5″ square corrugated or 4″ x 5″ plain rectangular leaders could be used.

Gutter Design

As is the case with leader design, judgment plays a large part in the design of gutters. The best type of gutter has the minimum depth equal to half and the maximum depth not exceeding three-quarters of the width. Thus the width becomes the deciding factor in proportioning its size. There is no reason for a gutter deeper than three-quarters of the width except for ornamental purposes, and for practical reasons it is distinctly desirable to keep the gutter shallow. Assuming that this proportion is observed the gutter may be referred to by its width only.

The size of gutters depend upon:

(1) The number, size, and spacing of the outlets.

The gutter acts as a receiving channel to carry the water to the

*Practically all the data in this article taken from "Sheet Copper," published by Copper & Brass Research Ass'n.

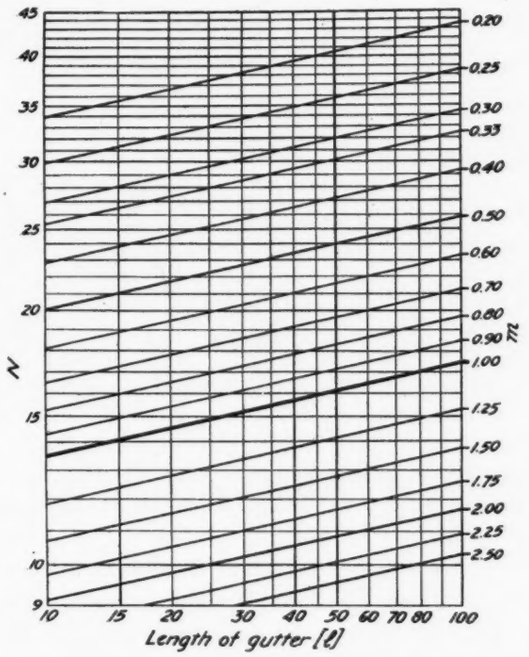


Chart 1

Rectangular Level Roof Gutters

Width of Gutter required for given roof areas and rainfall intensities. See also Chart 2. The quantity [m] gives the proportions of the cross-section. m = depth of gutter divided by width of gutter.

Fig. 133A

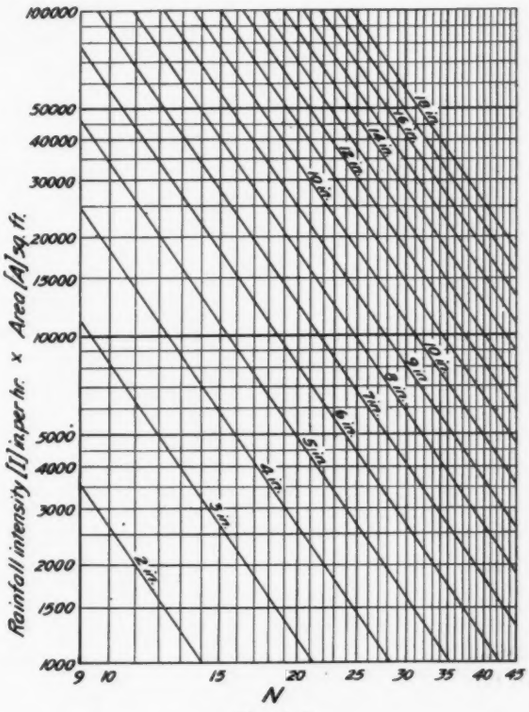


Chart 2

Rectangular Level Roof Gutters

Width of gutter required for given roof areas and rainfall intensities.

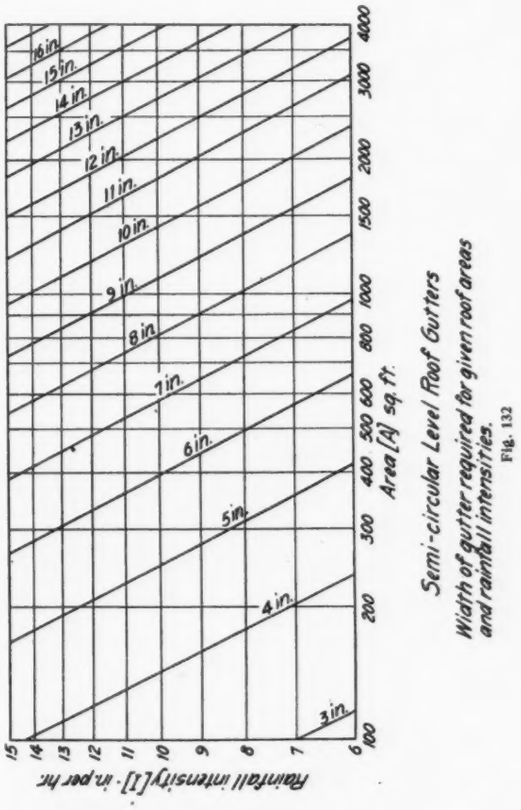
Fig. 133B

Type	Area in Sq. In.	Leader Size
Plain Round	7.07	3"
	12.57	4"
	19.63	5"
	28.27	6"
Corrugated Round	5.94	3"
	11.04	4"
	17.72	5"
	25.97	6"
Polygon Octagonal	6.36	3"
	11.30	4"
	17.65	5"
	25.40	6"
Square Corrugated	3.80	1½" × 2½" (2")
	7.73	2½" × 3½" (3")
	11.70	2½" × 4½" (4")
	18.25	3½" × 5½" (5")
Plain Rectangular	3.84	1¾" × 2½"
	6.00	2" × 3"
	8.00	2" × 4"
	12.00	3" × 4"
	20.00	4" × 5"
	24.00	4" × 6"

Fig. 131. Dimensions of Standard Leaders

	(A) Storms Which Should Be Exceeded Only Once in 5 Years		(B) Storms Which Should Be Exceeded Only Once in 10 Years	
	Intensity in Ins./Hr. Lasting 5 Minutes	Sq. Ft. of Actual Roof Drained per Sq. In. of Leader Area	Intensity in Ins./Hr. Lasting 5 Minutes	Sq. Ft. of Actual Roof Drained per Sq. In. of Leader Area
Albany	6	200	7	175
Atlanta	7	175	8	150
Boston	5	240	6	200
Buffalo	5	240	6	200
Chicago	6	200	7	175
Detroit	6	200	7	175
Duluth	5	240	6	200
Kansas City	7	175	8	150
Knoxville	5	240	6	200
Louisville	6	200	7	175
Memphis	6	200	7	175
Montgomery	7	175	7	175
New Orleans	7	175	8	150
New York City	6	200	7	175
Philadelphia	6	200	7	175
Pittsburg	6	200	8	150
St. Louis	6	200	8	150
St. Paul	5	240	6	200
San Francisco	2	600	2	600
Savannah	2	600	2	600
Seattle	2	600	2	600
Washington	6	200	7	175

Fig. 130. Rainfall Data and Drainage Factors



Semi-circular Level Roof Gutters

Width of gutter required for given roof areas and rainfall intensities.

Fig. 132

Charts by Courtesy of Copper & Brass Research Ass'n, published in their book "Sheet Copper."

outlet. The slope of the gutter determines the flow toward the outlets.

(2) The slope of the roof.

A steep roof carries the water to the gutter faster than a flat one does.

(3) The style of gutter used.

Some gutters are not effective for their full depth and width. In proportioning gutters proper consideration of the available area is essential.

(4) A gutter smaller than 4″ wide should be avoided.

In ordinary practice 4″ gutters are seldom used for they are difficult to solder and increase the labor cost. The gutter may be the same size as the leader it serves, but, of course, can not be smaller.

(5) Half-round gutters are economical and properly proportioned.

This type uses a minimum of material and insures a proper ratio of width to depth.

Gutter Sizes

Based on the above, safe rules for determining the size of gutters for ordinary work are:

(1) If spacing of leaders is 50′ or less, use a gutter the same size as the leader, but not less than 4″.

(2) If spacing of leaders is more than 50′, add 1″ to the leader diameter for every 20′ (or fraction) additional spacing on peaked roofs, and add 1″ for every additional 30′ of gutter length for flat roofs.

Examples:

1. A 40′ gutter serves a 3″ leader. The gutter should be 4″.

2. A 75′ gutter serves a 4″ leader on a flat roof. The gutter width is 6″.

3. A 75′ gutter serves a 4″ leader on a flat roof. The gutter width should be 5″.

For design of correctly sized gutters the use of the charts which follow are recommended.

Example 1:

A semi-circular level gutter is required to drain a roof area 20′ x 40′. The building is located in New York City.

Solution:

From Fig. 130, second column an extra heavy rainfall intensity of 8″ per hour is given for New York City. The roof area is 800 sq. ft. On the graph of Fig. 132 find 800 on the bottom scale, pass vertically to the horizontal line representing a rainfall of 8″ per hour. The intersection falls nearly on the line marked 7″ which, accordingly, is the width of the gutter required. If the intersection falls between two sizes, the larger one should, of course, be used.

Example 2:

A roof area 40′ long by 20′ wide is to be drained by a rectangular level gutter, the depth of the gutter being half of the width. The building is located in Atlanta.

Solution:

From the second column of Fig. 130 the maximum intensity of rainfall for Atlanta is found to be 7″ per hour. From the proportions of the gutter, m=0.5 (depth divided by width). On the chart Fig. 133A length L = 40. Pass vertically to the heavy line representing m = .5, and going horizontally to the left read that N = 23.3.

The rainfall intensity (I=9) times the area (A=800) gives IA=7200. On the chart Fig. 133B, locate N=23.3 at the bottom scale, and pass vertically to the horizontal line representing IA=7200. The point of intersection falls between the lines representing widths of 6″ and 7″. The required gutter width is, therefore, 7″.

The required sizes of level gutters of other than semi-circular or rectangular shapes can be determined approximately by finding the semicircle or rectangle of the same area which most closely fits the irregular cross-section.

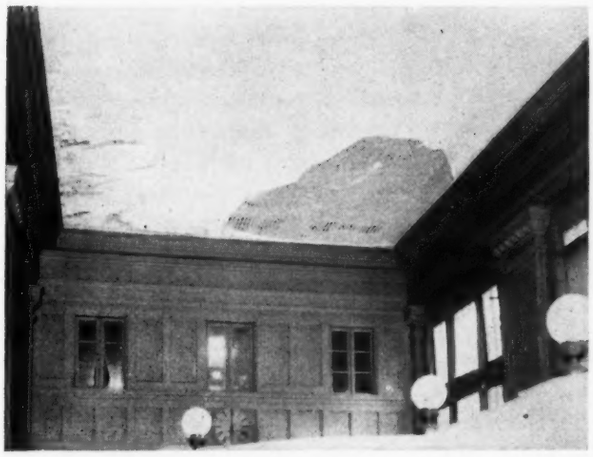
Outlet Design

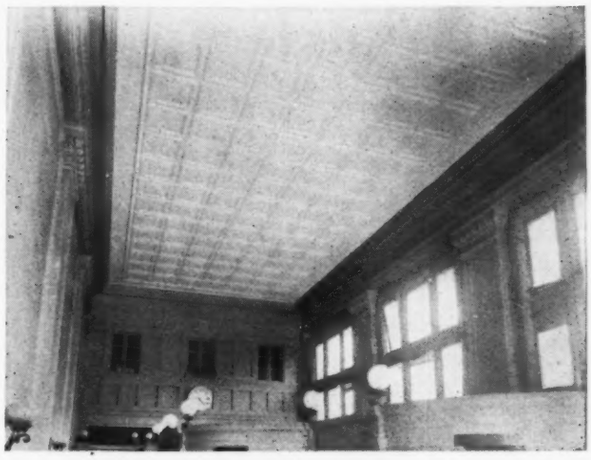
The design of outlets is of great importance, for if they are not properly proportioned the horizontal gutter flow will not be adequately transmitted to the vertical leaders. Although the latter may be of sufficient capacity, that will be of no avail in preventing overflow if the outlets do not permit the drainage to enter the leaders as fast as it arrives.

It has been found from experience and tests that outlets should be elliptical or rectangular in plan with the larger dimension in the direction of the gutter flow. For semi-circular gutters, outlets should be as long as the gutter width and two-thirds as wide. For rectangular gutters 6″ wide or less, the outlet should be about 2″ less in width than the gutter and of the same length as the gutter width. For larger gutters it is safer to make the outlet the full gutter width and about one and one half times as long.

With the area of the top of the outlet (in the gutter bottom) determined as just outlined, it is tapered down to the size of the leader.

Many practical and useful charts, tables and helps are scheduled for publication among our data sheets. So far as possible, presentation will be equally divided between heating, ventilating, sheet metal. Your suggestions on how these data sheets can be made most valuable or your requests for certain sheets are welcome and will be met if possible. Send in your preference or requests for sheets.





Before and After—A Ceiling Story

IN these days when diversification of work and remodeling are accounting for such large portions of most contractors' activities many firms have turned to metal ceilings as a source of contracts more saleable than in years past. Probably the chief reason for this renewed customer interest in metal ceilings can be accounted for by owners' desire to make their vacant and rented property attractive by freshening that important part of any interior—the ceiling.

The two sets of "before" and "after" photographs show two installations made by eastern contractors in rooms where the effects of water and poor plaster caused unsightly and dangerous ceiling conditions repaired and made permanent and safe with steel ceilings.

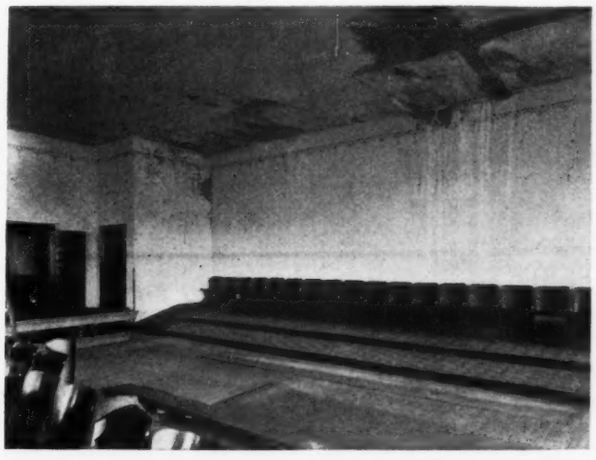
One of the sets of photographs shows the plaster ceiling in the Masonic Lodge in Berwick, Penna. As indicated by the water streaks on the wall and the large dark areas where water shows through, the plaster was made unsafe and unsightly requiring a complete new ceiling. Harry Fahringer of Berwick, contractor, convinced the lodge members that a metal ceiling would make a recurrence of this trouble impossible and further that a metal ceiling of correct pattern with metal clad side walls in a modern pattern would give a room of much dignity.

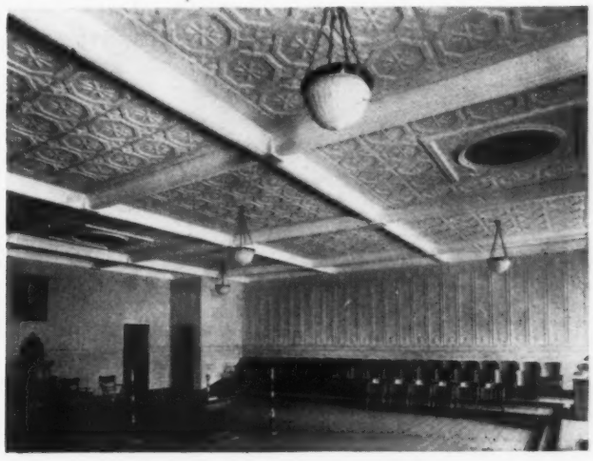
That his recommendations were well founded and, also, that this contractor knows how to combine patterns with excellent workmanship is indicated by the "after" photograph which shows a room of dignity, richness and really classical appearance.

The second set of photographs were made in Spring Valley, New York, in the First National Bank where the plaster ceiling failed to withstand vibration and fell endangering employees.

Paul C. Wolf, steel ceiling contractor of Spring Valley, showed the owners that a steel ceiling would harmonize with the rich woodwork of the walls and, in addition, eliminate future danger from falling plaster. His recommendations were for a large pattern, mediumly heavy with a plain border next to the walls.

The height of the ceiling—almost two full floors—made this selection advisable. In order to minimize the preliminary work the ceiling was erected with toggle bolts.





An Ice Vendor By A Sheet Metal Fabricator

APPROXIMATELY one thousand pounds of sheet metal are going into the cabinet alone used with each coin operated ice vending machine manufactured by The Booth Engineering Company, Ltd., one of the largest sheet metal contracting firms in the Los Angeles area.

The ice vending machines mark a new departure in the ice business, packaged ice taking the place of the unwrapped ice to which the public has been accustomed. Wrapped in perfectly shaped twenty-five pound packages, two and a half tons are placed in the big "nickel-in-the-slot" machine, the customer setting the mechanism in operation by inserting three nickels or a nickel and a dime, one cake of ice being delivered to him.

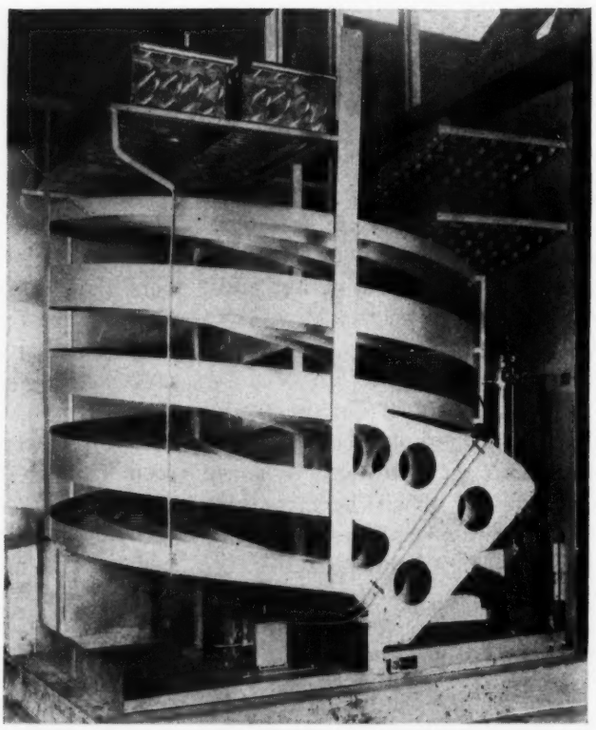
The exterior dimensions of the "ServICE" machines are 8 feet by 8 feet by 10 feet, approximately. The exterior walls are made of 20-gauge sheet iron galvanealed while the roof is of 24-gauge galvanized steel. The butt straps are 12-gauge steel. The floor is of 24-gauge galvanized steel and this extends up three or four feet forming the inner wall. The cabinet has six inches of cork insulation between the walls, the inner wall from the sheet metal wainscoting up being of plywood.

The wrapped cakes of ice are fed in through a side door near the top of the cabinet and move spiral fashion on the coin operated spiral track to the bottom door where it is released for the customer. The spiral guides are of 10-gauge sheet metal.

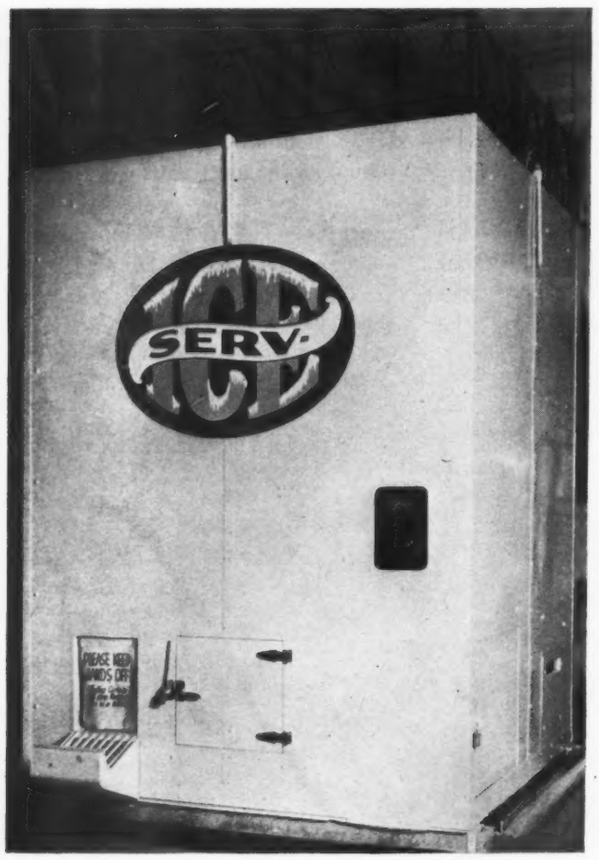
The entire machine is made by this company with the exception of the motor, the switches and the bearings which are purchased for installation.

The machine complete sells for $3,600 and at present is being furnished to three major ice companies.

The Booth company has promoted the machine by use of movies shown at various conventions, through trade journal advertisements and by means of a field salesman whose chief duty is to be present for two or three days at a location after a machine has been placed explaining its advantages and method of operation to the public.



Right—Inside of vendor showing cooling unit and metal track on framework



This picture of the outside and the picture above show how fabrication was laid out and the appearance of the assembled unit

ASSOCIATION Activities

Philadelphia

We have elected a local Code Authority Committee, awaiting the approval of the National Divisional Code Authority and Administrator, which will govern only the metropolitan district of Philadelphia. This committee has met a number of times and is mapping out plans for immediate action as soon as the Code is signed.

Preparations are under way to determine a method of cost finding, which will be placed in pamphlet form and distributed to the entire trade. A member canvass of the entire area has been going on for the purpose of listing every shop and there has been a good response. The number of shops thus far listed is approximately 750. A thousand copies of the latest issue of the Standard Code was ordered and we are preparing to hold meetings for the instruction needed to make the Code clear to all the trade.

All active Philadelphia Associations have joined this association for the purpose of administering the Code. The officers and directors, elected January 1st, are printed on the left side of this sheet. Business has been spotty but the jobbing business is on the increase; some shops showing a gain. No large contracts of any moment have been awarded during the past 60 days. A few contracts for air conditioning in large department stores and buildings are being installed. Generally, business is on the pick-up.

The association meetings are very well attended and the subjects discussed have included: cost finding; code information; code member assessment; working conditions; wages and hours; and shop statement discussion. The association has continually sent letters through the mail to the trade on subjects pertaining to the membership and the Code. The number of signers of the certificate of compliance has now reached 370. The members in good standing in the association proper is over 100 and new members are added each month. The interest in association affairs is increasing and it is expected to be the agent for Code guidance.

Fred U. Ritter,
Secretary.

Wisconsin

The Wisconsin Association has been notified that the code authority committee will demand statistics from the industry in Wisconsin on the method of doing business. We believe when the National Code is put into effect the necessary supervision can be set up.

With this future demand in mind the board of directors of the Wisconsin Association have decided to cooperate to the fullest extent to place in the hands of the committee the information requested.

In order to make members acquainted with the information which will be asked for a sample form has been mimeographed and mailed to all members. The state association is asking contractors to fill in the form and return as quickly as possible so that work and compiling of information can proceed quickly.

Paul L. Biersach,
Secretary.

SHEET METAL CONTRACTORS ASSOCIATION of WISCONSIN
PAUL L. BIERSACH, SECRETARY
2371 - No. GRANT BOULEVARD - MILWAUKEE, WISCONSIN.

OVERHEAD EXPENSE

	1930	1931	1932	1933
Total amount of business for the year	$	$	$	$
Amount paid for material	$	$	$	$
Amount paid for productive labor	$	$	$	$
First Cost (Total Labor & Material)	$	$	$	$
Amount paid for Expense. Consisting of:- Salaries, Auto and Truck, Donations, Advertisement, Labor - non-productive and lost time; tools & repairing, shop expense; Light, Heat, Power, Telephone and Telegraph, Printing - stationery, etc. Postage, Rent, Trade papers, Bad debts, Taxes - City, County, State; Depreciation Insurance - fire, liability, accident and compensation; Legal - attorneys fees, etc. Freight, drayage and express; Car fares, Collections, Mercantile reports, Allowances.	$	$	$	$
Total Cost (First cost total and Expense)	$	$	$	$
Percentage of Expense to productive labor				
Percentage of Expense to Labor & Material combined				
Percentage of Expense to Yearly Business				

Tri-State

The Tri-State Association of Sheet Metal Contractors is waiting for the National Code to be signed by President Roosevelt. The association has prepared several hundred letters which will be mailed out just as soon after the signing of the code as possible. These letters are designed to stimulate interest in association activity. A centrally located city will be selected and a call will be sent out for a convention at which convention officers, committees and necessary transactions for compliance with the code will be carried on.

One of the problems confronting the association is what to do about enforcing the code and it is hoped that this convention to be called can determine just what methods of enforcement are best suited to our locality.

Sid H. Bowen,
Secretary.

Milwaukee

The regular monthly meeting of the Milwaukee Sheet Metal Contractors' Association was held May 2.

The committee on legislation and codes reported that considerable progress had been made with formulating a basic state code and that conferences with other groups had been held. While nothing of a definite nature has yet been put into action, the committee reported that favorable progress is being made and that some action will be taken a little later. The committee reported that the state has been divided into seven districts and each district will have a board acting under the state code authority board which, in turn, will co-operate with the national code authority committee.

Future meetings will be held to iron out all the problems connected with putting the code provisions into action. A committee consisting of members Marth, Kremer and Podolske was appointed to look into the general proposition of co-operating with various city governments for the purpose of introducing into the city codes the necessary ordinances to emphasize the importance of adequate ventilation and suitable air conditioning.

Paul L. Biersach,
Secretary.

Association Activities . . . .

Michigan

Business in the state of Michigan has shown a slight pick-up in the sheet metal and roofing field. Its effect may be seasonal, but the Michigan Association hopes that increased work will be let to contract during the balance of the year. There has not been construction of any size let recently and most of the work has been remodeling and repair.

As reported in AMERICAN ARTISAN, issue of April, the state has been divided into 14 districts and 10 of these districts have already been organized for code compliance. Approximately 150 new members have been added to the state association.

F. E. Ederle,
Secretary.

▼ ▼

Waterloo, Iowa

The association is holding regular monthly meetings and enjoying an attendance of practically 100 percent at each meeting.

All members in this association are enjoying increased business and all members are firm in the belief that better business conditions may be anticipated. The enthusiasm for association work is on a high level and the committees are finding that excellent cooperation is extended by all members.

The association is anxiously awaiting the signing of the National Code and just as quickly as the code is signed the necessary provisions for compliance will be made.

John G. Wright,
Secretary.

▼ ▼

Indianapolis

There has been a great deal of association activity in Indianapolis during the past month and a half.

There has been an organization of the sheet metal and warm-air heating men here for some years past, but inasmuch as the roofers are to be under the same code, the association was reorganized on April 4th to include the roofing contractors of the city. On that date a dinner meeting was held in the Architects' Building. A constitution and by-laws were adopted, and the following officers elected:

E. L. Carr, President; Joseph E. Mattingly, Vice-president; E. R. Mullin, Secretary; H. D. Clarke, Treasurer.

Board of Directors: Sheet Metal Division, Joseph C. Gardner, chairman, M. Thompson, W. S. Waters.

Warm-Air Heating Division, T. M. Rybolt, chairman, T. J. Cornwell, Guy Lefforge.

Roofing Division, J. W. Collins, chairman, Vernon Reeder, Thad Clarke.

Each division has had several meetings in which plans have been formulated in anticipation of the Code going into effect. A Code Data Committee has also been appointed. We feel we are well along with plans to meet the code requirements and that with the cooperation of the state and national groups everything will be well.

On April 30th a membership drive meeting was held. At that time several applications were signed, making the membership about fifty-five at the present time.

The principal activity of our association, we realize, will have to be of an educational nature. Programs will be planned with that fact in mind.

Elmer R. Mullin,
Secretary.

▼ ▼

Fort Wayne, Indiana

The Fort Wayne Association now has a membership of 48 firms out of a possible 51 which gives the association a membership rating of 92.1 per cent.

The association is laying plans to make a complete canvass of the entire district and enlist all contractors who will come under the code.

The association is very proud of their membership drive and the association has found that interest in the code has stimulated interest in the local association to the extent of bringing in many firms which originally had little interest in association activity. Indicative of this renewed interest is the fact that a levying of $1.00 per firm had recently been assessed to cover the cost of the canvass and every firm solicited responded with the payment.

Our district meeting was held as scheduled and we feel it was most successful.

At the meeting which was very well attended, we organized the district Code organization.

This, we feel, will be subject to changes at the time it will be presented to the administrator for approval.

However, the following counties were represented and nominations made as per follows:

For Adams County, Fred Ashbacker, Decatur; Allen County, Chas. E. Tharp, Ft. Wayne; DeKalb County, L. Wait Widney, Auburn; Huntington County, E. C. Lahman, Huntington; Kosciusko County, K. L. Stokes, Warsaw; Noble County, R. M. Bowser, Avilla; Wabash County, Cash Lawrence, Wabash. This leaves nominations to be made from Wells, Whitley and Steuben counties. In case these nominations are not made by the contractors from those counties, they will be made by the district authority any way.

At the afternoon meeting it was decided that we in this state should represent our industry as code authority without a dissenting vote, after we were reliably informed that at least two men from this state not engaged in the industry had applied for the appointment of code authority for the construction industry of the entire state.

We have worked hard to get the district organized and have met with some reverses, as many contractors do not feel they are interested in the code since there are only two or three shops in a given locality. They can see no cause for them to join any organization to take care of their business. However, at last Friday's meeting several of these men changed their decision and placed their membership in the organization.

Business in this locality is on the up grade, but still there remains plenty of room for improvement which appears to be in the very near future, mostly repair work or remodeling at present, however there is some new work in sight very shortly.

Charles Tharp,
President.

▲ ▲

Rochester, N. Y.

The Rochester, N. Y., Sheet Metal, Furnace and Roofing Contractors Association have elected officers for ensuing year as follows:

Thomas S. Woodard—President.
John A. De Witte—Vice President.
Harry Fitch—Secretary.
Ivan Coe—Treasurer.

Directors:

Walter Schoeneman
William Schmitt
George Ballard
James Crombie
Edward Klick.

These officers were elected at a well attended and enthusiastic meeting. An aggressive program mapped out by the new President calls for a strenuous campaign for new members, instruction of members in air conditioning, at which point was brought up the generous offer of the American Artisan of including with a two-year subscription the Air Conditioning Articles published in the American Artisan by Mr. Overton.

The New York State Ass'n Convention

William J. Schmitt, Rochester, President

THE eleventh annual meeting of the New York State Sheet Metal and Roofing Contractors Association was held at Albany, April 9 and 10, in conjunction with a state code conference held April 11 and 12. From the standpoint of interest and attendance this 1934 convention of the New York Association marks a new high-light in the activity of the organization and indicates the extent of the interest and acceptance of code cooperation as a means of eliminating many of the problems of the contracting business.

The opening address of the convention, by President William J. Schmitt, was followed by an address from William M. Crane, Jr., of the Copper and Brass Research Association, who spoke on "Artificial Patina in Copper." Mr. Crane discussed the interest of architects and the public in general in the attractiveness of patina and outlined past research and investigation into the possibility of reproducing this natural patina by artificial means. Mr. Crane then explained how the Copper and Brass Research Association had devoted many years to a study of various suggested methods of reproducing patina artificially and outlined the process which the association is now recommending. The recommended process is essentially a spraying proposition with special solutions sprayed on the copper under favorable weather conditions. The chemical reaction set up by the solution results in a patina which is very close to that formed by nature.

In the afternoon, George Ballard of Rochester delivered an address on roofing covering the general history of all types of roofs. Mr. Ballard's paper, will be briefed and published in a later issue.

Committees

At the afternoon session President Schmitt appointed the following committees:

Nomination

George Ballard, Rochester.
F. Sims, Buffalo.
John Rausky, Utica.

OFFICERS

President—W. J. Schmitt, Rochester.
First V. P.—H. W. Noragon, Buffalo.
Second V. P.—D. V. Quackenbush, Gloversville.
Treasurer—Edward F. Klick, Rochester.
Secretary—Adolph Hesse, Utica.

DIRECTORS

***Term Expires* 1935**

John Raushe, Utica.
Wm. Kirkpatrick, Buffalo.

***Term Expires* 1936**

H. A. Daniel, Newburgh.
Thomas Woodward, Rochester.

***Term Expires* 1937**

A. C. Friedenburg, Amsterdam.
Emil Everts, Syracuse.

STATE CODE AUTHORITY COMMITTEE

For Western New York (Buffalo district), C. J. Meyer, Buffalo.
For West-Central New York (Rochester district), George Ballard, Rochester.
For Central New York (Syracuse district), Frank Harmon, Syracuse.
For East Central and Northern New York (Utica district), D. V. Quackenbush, Gloversville.
For Northeast New York (Albany district), James Keays.
For Southern New York (Newburgh district), H. A. Daniel, Newburgh.

Adolph Hesse, Utica, Secretary

Resolution

H. A. Daniel, Newburgh.
Wm. C. Kirkpatrick, Buffalo.
Wm. Hall, Binghamton.

Auditing

C. Meyer, Buffalo.
A. Kellogg, Albany.
H. Steinhorst, Utica.

Addresses

Appointment of committees was followed by an address from Dana Norris of the Lennox Furnace Company on "Credit and Collections." Mr. Norris, having been director of the National Warm Air Heating and Air Conditioning Association committee on credits and collections, was well qualified to present this subject. He suggested five rules to make credits and collections more certain and more satisfactory. These rules are:

1. Look up the credit of the buyer through all credit agencies.
2. Have definite terms of payment arranged before the order is taken.
3. Do work right and complete the work promptly.
4. Send invoice as quickly as possible and do not wait until the first of the month.
5. Do no work without a written order.

Mr. Norris also suggested that contractors stop carrying installment accounts as the contractor is not in the banking business. The contractor's capital can be used to

better advantage than for long time-payment financing.

W. W. Graham, of American Rolling Mill Company, addressed the convention on the subject—"Better Selling." Mr. Graham asserted that the depression has shown us how *not* to sell. The public, according to the speaker, is now ready to buy, but sales will have to be made gradually. Mr. Graham also offered the interesting comment that the public is not looking for the "cheapest," but is now willing to pay a fair price for a good article which is well advertised and intelligently sold. There is business to be had, but it must be gone after with personal calls, direct mail and all types of follow-ups particularly with old customers. The contractor should not overlook any possible field for his services such as manufacturing, commercial and industrial establishments as well as home owners.

The speaker of the evening was Edwin A. Scott, Editor of Sheet Metal Worker, who, as advisor to the National Code Authority, addressed the convention on the subject of "What You Should Know About the Code." Mr. Scott outlined the principal provisions of the code and emphasized the points which he said too many heating contractors were overlooking. The speaker emphasized that policing of the code and securing contractors' adherence to the various provisions will be more a matter of work for the local and state committees and associations than for the National Committee. Numerous questions relating to the code compliance were answered by the speaker.

The first speaker on Tuesday morning was H. A. Daniel of the Atlas Roofing Company. His subject was "Benefits Derived from Co-operative Efforts of Manufacturers, Jobbers and Contractors." According to Mr. Daniel, there is little to be accomplished in business without the full co-operation of all units. The contractor must give co-operation to the jobber and the jobber, in turn, must give co-operation to the manufacturer. Conversely, the jobber must co-operate to the fullest extent with the contractor in order that business for all members of any industry can be obtained at the greatest profit. Mr. Daniel suggested that contractors give close attention to the various trade papers and take advantage of the opportunity offered in their pages.

C. A. Ruth, Republic Steel Corporation, spoke on "Co-operative Service between Manufacturers and Dealers." Mr. Ruth stated that he firmly believed 1934 will mean increased business for all contractors and that the business of the contractor should be to sell by every possible legitimate means. The speaker recommended the use of circulars, blotters and any other types of advertising helps offered by manufacturers and salesmen. Mr. Ruth also recommended that the sales forces of the jobber and manufacturer be used to the fullest possible extent by the contractor whenever he is up against problems on which the salesmen can offer help.

J. H. Van Alsburg of the Hart & Cooley Manufacturing Company spoke on the subject, "Conditioned Air," at the luncheon meeting. Mr. Van Alsburg combined sales and engineering in his talk and discussed at some length the contents and qualities of air and outlined the possibilities for present and future sales.

Business

The afternoon session was devoted to presentation of committee reports, election of officers and directors and other business. The officers and directors for 1934 are shown in an adjoining column. It was announced at the convention that the various manufacturers interested reported more business and better orders than at any previous convention. Adolph Hesse, Secretary, reported an increase in membership of about 90 per cent during 1933 and the fore part of 1934. Mr. Hesse also gave a brief resume of the activities and accomplishments of the various local associations within the state during the last year.

Resolutions were offered deploring the insertion of wage agreements for skilled mechanics in the codes for the sheet metal, ventilating and air conditioning industries. A resolution was proposed to be presented to the legislature opposing the change in standards in ventilation for school rooms and recommending that the standards of the American Society of Heating and Ventilating Engineers be followed.

Codes

The Thursday and Friday sessions, devoted to code problems and discussions, took up as the first matter of business the organization of district No. 2, comprising all of New York State lying outside the metropolitan New York area. Discussion was held on the feasibility of dividing the state into six regional districts and the appointing of a state code authority composed of one man from each of the regional districts.

It seemed to be the consensus of the convention that each state code authority member should be responsible for the organization of his district and should supervise the forming of local groups and local code authority committees within his district. These local code authority committees should be made up of men elected by the local organizations within each district, but no regional committee should consist of more than 15 members.

For the purpose of financing the code work, it was proposed that assessments be on the basis of one-fifth of one per cent of the total volume of sheet metal and roofing business done per year by each member. It was also proposed that the minimum payment be $10.00 and that payment of the assessments should be made quarterly. No definite decision was made on this point, but decision will be held until the formation of the local or regional committees.

The convention elected members of the state code authority as shown in an adjoining column.

Air Conditioning Section

Devoted to the technical and merchandising problems of air conditioning in homes and small buildings

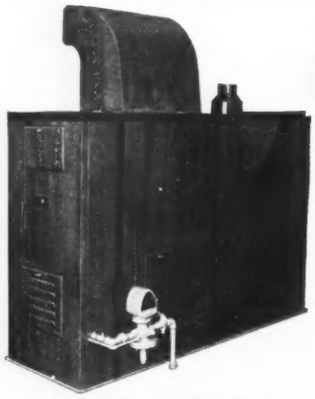
LAST June we began a series of articles on automatic controls. We started the series because we believed that the proper selection and application of control apparatus is one of the most important problems in any satisfactory installation.

- - - Investigation disclosed that too many contractors used the same apparatus, hooked up in the same way and set at the same settings for all their jobs.

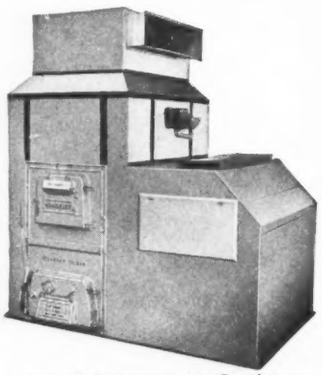
- - - Manufacturers have done everything within reason to help the contractor but the manufacturer cannot inspect every job. The contractor must, therefore, know as much as possible about automatic control.

- - - Three control systems have been discussed to date. The articles have been *practically* tested in the Test Houses under observation.

- - - These facts stand out—our original belief was absolutely right—every installation *is* a separate problem; observation and test *must* be used on every job to get satisfactory control; we must be able to analyse the fundamental problems before we can control satisfactorily.

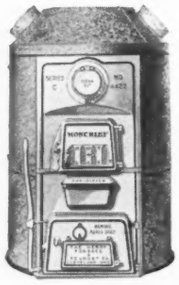


Moncrief Gas Air Conditioner



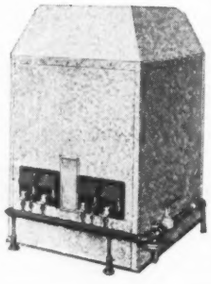
Moncrief Aristocrat Air Conditioner

Moncrief Series "C" Cast Furnace



Moncrief Series "S" Steel Furnace

Moncrief Series "B" Gas Furnace



With the Complete

MONCRIEF LINE

You Can Take All the Business Your Community Has to Offer

For instance: For the man who wants the best heating system that money can buy, you have the Moncrief Gas Air Conditioner which provides him with every convenience that engineering skill can devise.

Or the Moncrief Aristocrat, a complete air conditioning system burning oil or coal, hand or stoker fired.

For regular warm air jobs, the modern Series "C" cast furnace presents the utmost in design, construction and value; and the Series "S" in steel is equally meritorious.

Then, you have the Series "B" Gas Furnace, modern, attractive and a marvel of economical operation.

To help you sell you are supplied with a complete line of sales literature for every occasion. You don't have to "go it alone" when you sell the Moncrief line.

NRA MEMBER U.S. WE DO OUR PART

Send for particulars of the Moncrief line and learn how you can do a bigger and better business this season.

THE HENRY FURNACE & FOUNDRY CO.
3471 E. 49th St. Cleveland, O.

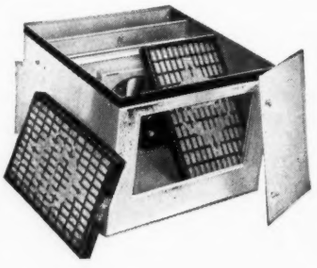
We supply everything used on a warm air heating job

Another Profit Producer . . . MILES Junior AIR CONDITIONER

Every furnace heated home a prospect. Priced within the means of all. Saves cleaning; saves coal; cures sick furnaces. You can make money and make friends selling the Miles Junior.

Send For Particulars

Only $63.40 to Dealers Complete with controls and filters



Residence COOLING *by* Attic Ventilation

Tested and found satisfactory in every respect, residence cooling by means of a fan installed in the attic offers new profit possibilities to alert contractors.

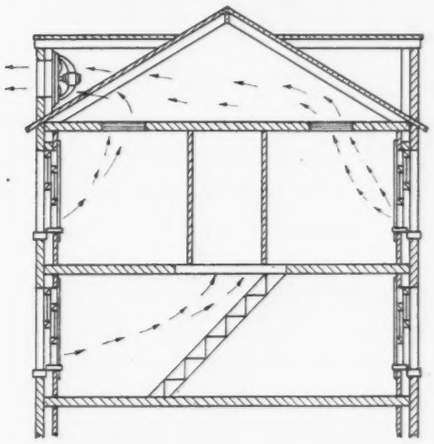
By means of a simple installation of motor-driven fan, either propeller type or (recommended) the multiblade centrifugal type, the air is drawn from the sleeping quarters or living rooms and discharged out through the attic, while the cooler night air is drawn into the house from out-of-doors.

There is a real opportunity for you in the sale of Buffalo fans for attic cooling systems. The cost of the installation complete is low enough so that you have hundreds of prospects. We have

Complete Information Covering Installation, Etc.,

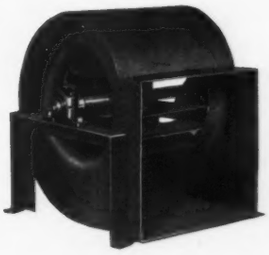
which will be sent to you if you are interested. Why not go after some summer profits on home cooling?

WRITE TODAY



Two Types of Fans *for* Attic Ventilation

Buffalo H.V.A. Fans are recommended because they are designed for residence use; are extremely quiet in operation and highly efficient. Driven by motor and V-belt, they may be run at relatively low speeds with ample air capacity. Several sizes available for stock shipment.



BREEZO Fans, while not quite as as quiet as H.V.A. Fans usually cost less to install, and when extremely quiet operation is required, a three speed motor is recommended.

BREEZO Fans are high efficiency type, noted for quiet operation and fool-proof, all-steel construction. Complete range of sizes in stock.

Buffalo Forge Company

497 Broadway, Buffalo, New York

In Canada: **Canadian Blower & Forge Co., Ltd., Kitchener, Ont.**

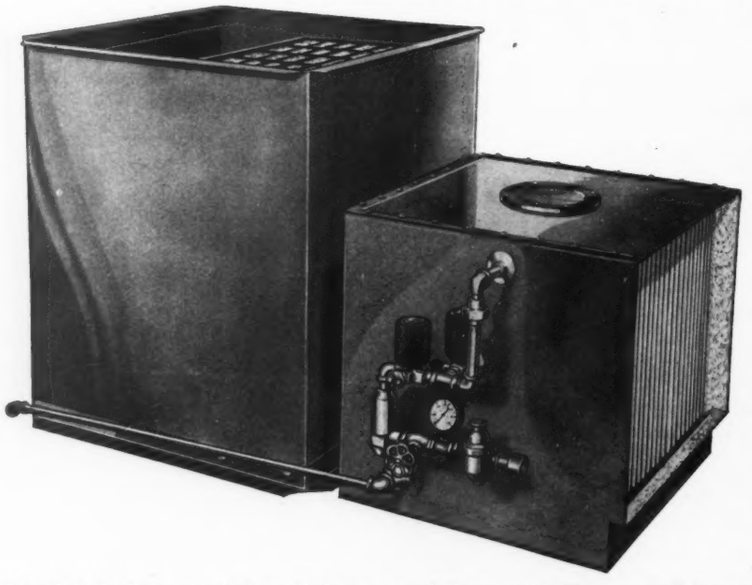
The new

COMPACT CONDITIONER

AND DOMESTIC WARM AIR FURNACE BLOWER

What are the most vital factors that govern the construction and operation of Domestic Air Blower and Conditioning Equipment?

PERFORMANCE and ECONOMY!



Performance —is the first consideration, because operation must be obtained by a construction that involves the simplest mechanism and requires the least attention. All adjustments and controls must be easily manipulated and have quick, positive action. The equipment must, as a whole, function faultlessly in the capacity in which it is designed to perform, namely: The equipment must furnish perfect conditioning of the air circulated through the home. It must filter—wash—purify—and humidify all the air at all times.

Economy—the second vital consideration, demands that the equipment be as inexpensive as quality construction and perfect performance will permit. It must be "Compact" to take up, as little as possible, of useful floor space, and it must involve the least installation alteration expense. Above all, it must operate on an absolute minimum of water and power consumption.

The B&B Compact Conditioner and Domestic Furnace Blower is built by the manufacturers who have made the famous Massachusetts Blower and Washers for over thirty years!

The Domestic Blower is a complete unit within itself involving all the features of construction and operation that have made the Massachusetts Blowers so popular and successful. Coupled with the conditioner element it affords a neat and compact unit that meets every requirement for the proper conditioning and circulation of warm air in a domestic heating system. In all respects these units are built to comply with the two vital factors of Performance and Economy!

In substance the Compact Conditioner is a commercial unit, built to domestic proportions.

Investigate this New, Efficient Unit Today!

— MAIL THIS COUPON —

The Bishop & Babcock Sales Co.
Cleveland, Ohio.

Gentlemen: Send me complete literature on the B&BCompact Conditioner, also, send me full particulars concerning your Distributor's Franchise.

Name ..... Attention of .....

Address ..... City ..... State.....

THE BISHOP & BABCOCK SALES CO.

CLEVELAND, OHIO

Automatic Controls

We bring to a close here the discussion of the fourth control hookup, sometimes called "keeping heat on the shelf." Several wiring diagrams are given, each properly marked so you can wire from the drawing. Generally speaking, we feel that this control system has more disadvantages than advantages, except for special jobs and recommend that contractors investigate all conditions carefully before deciding to use this hookup.

A SOMEWHAT different set of conditions are established in the second variation of this hookup. In this variation number two, the room thermostat starts and stops the fan and the fire is controlled by a stack or bonnet fire control, but the fan is so wired that it cannot run while the draft is open.

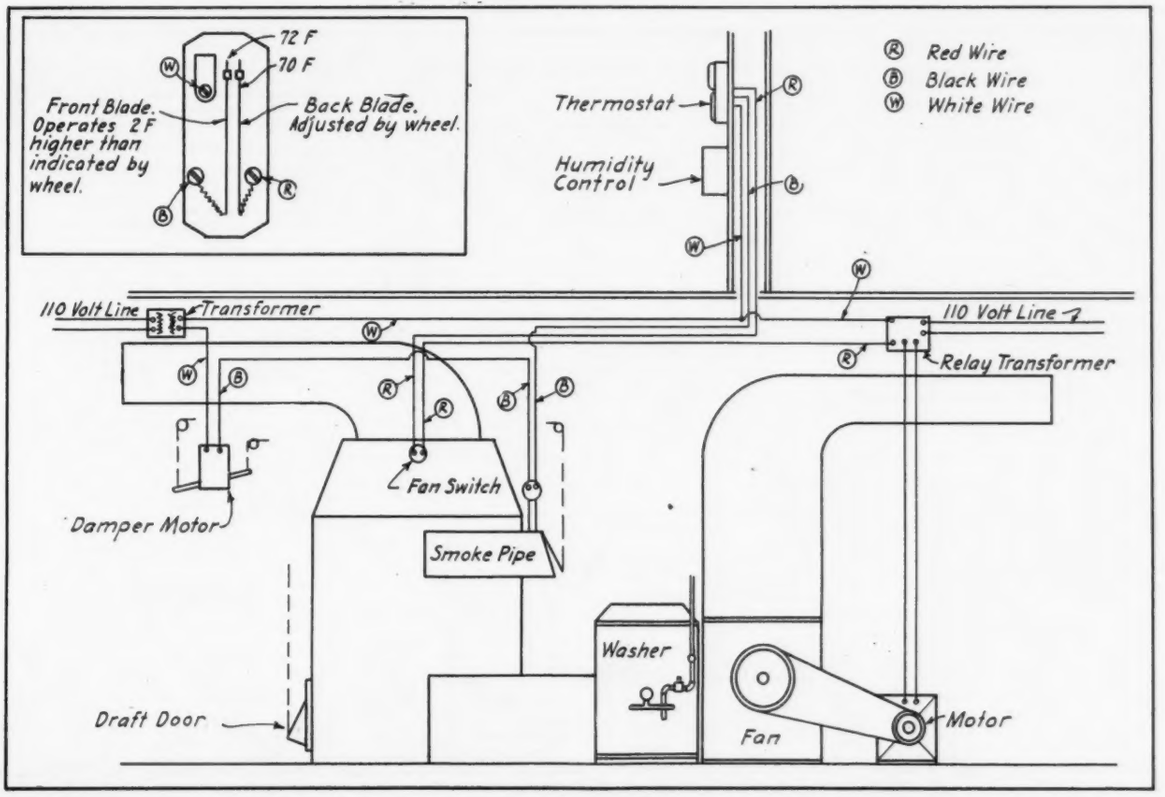
Under this system we establish a cycle of operation which alternates fire acceleration and fan operation. In other words, the draft opens and the fire accelerates raising the bonnet air temperature to the limit control "high" setting. The draft closes. Then if the room thermostat calls for heat the fan runs. If the room thermostat calls for heat while the draft is open the fan must wait until the draft closes before it starts.

The conditions set up by this hookup differ considerably from the conditions established in our first three hookups. Again going back to our first discussions on settings, let us say that we set the high setting of the limit control a few degrees above the register air temperature for which we have designed our system. If our register air temperature is 140 degrees and we figure a temperature drop of 15 degrees to the most exposed room we set our high limit control setting at 155 or 165 degrees.

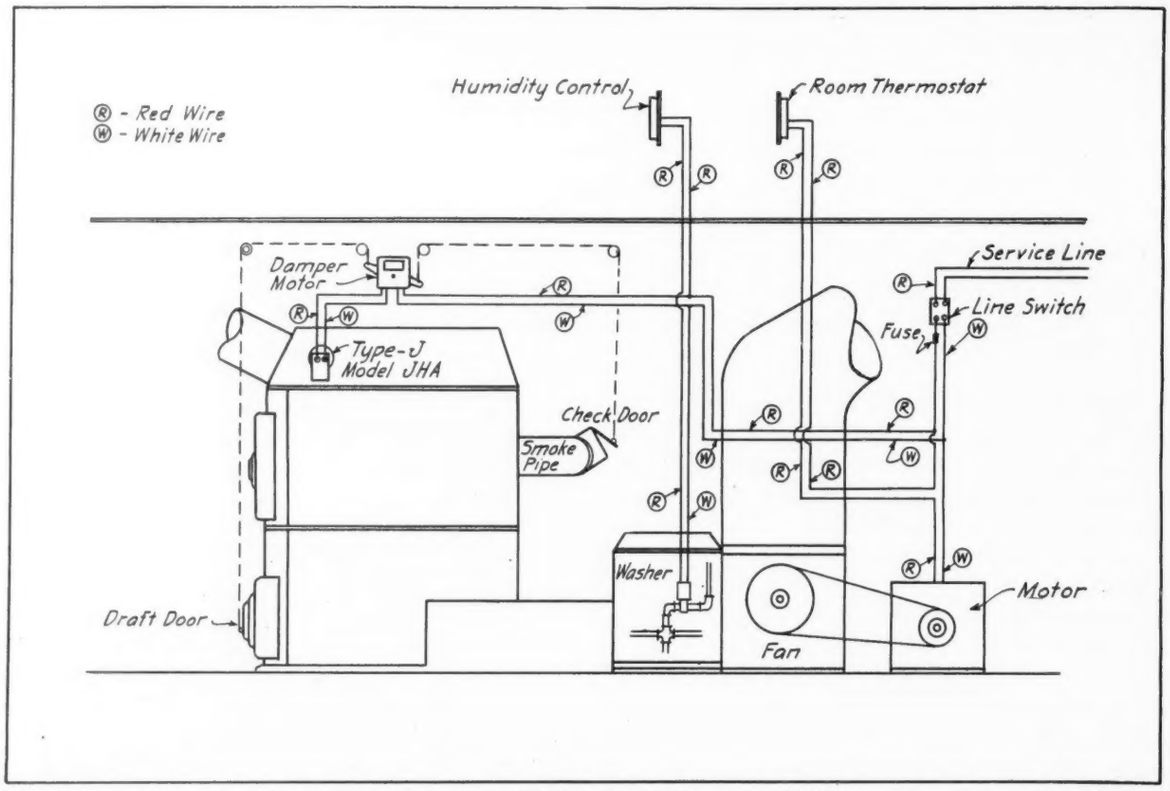
In the instruments on the market we have our choice of limit controls having set differentials say

(*Text continued on page* 40)

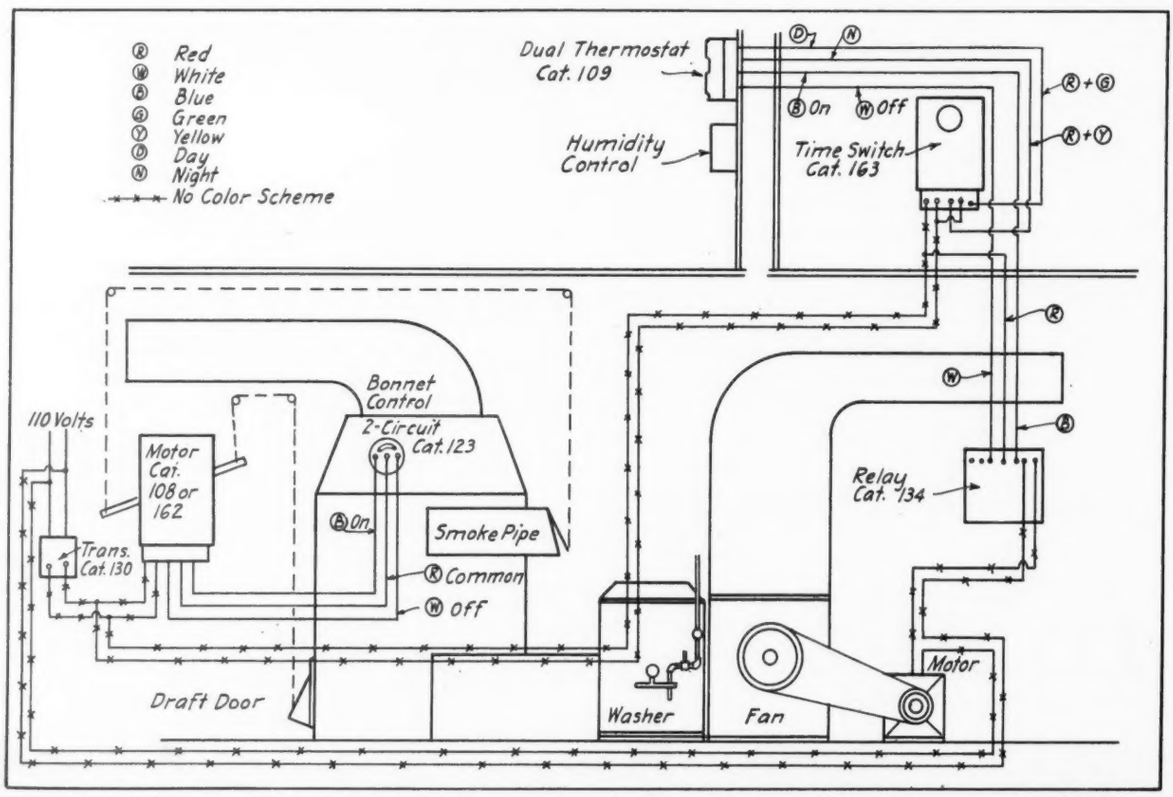
Wiring diagrams on following pages.



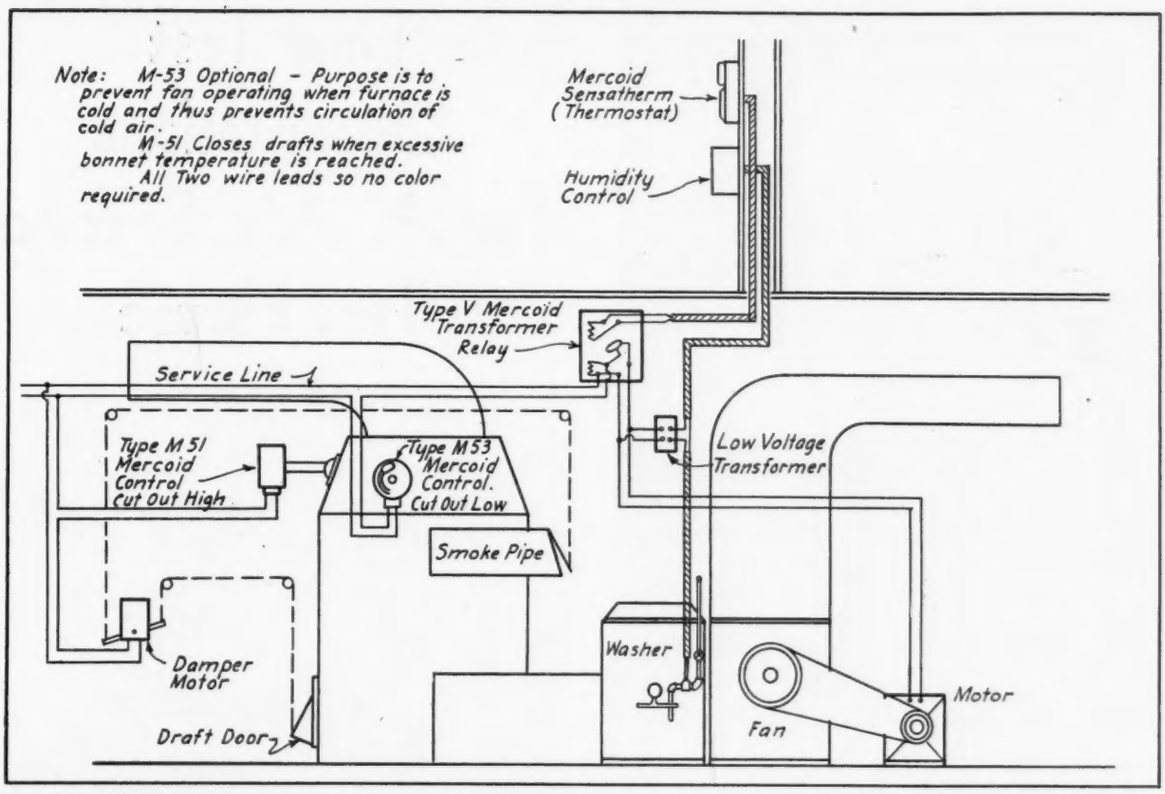
The wiring diagram above shows Detroit Lubricator Company instruments with a stack fire control and a two-bladed thermostat. The regular blade of the thermostat operates the fan. The limit control normally operates the draft, but if the room temperature rises two degrees the second blade of the thermostat closes the dampers. The company states they believe such a supplementary arrangement is necessary to prevent room temperature over-run in mild weather.



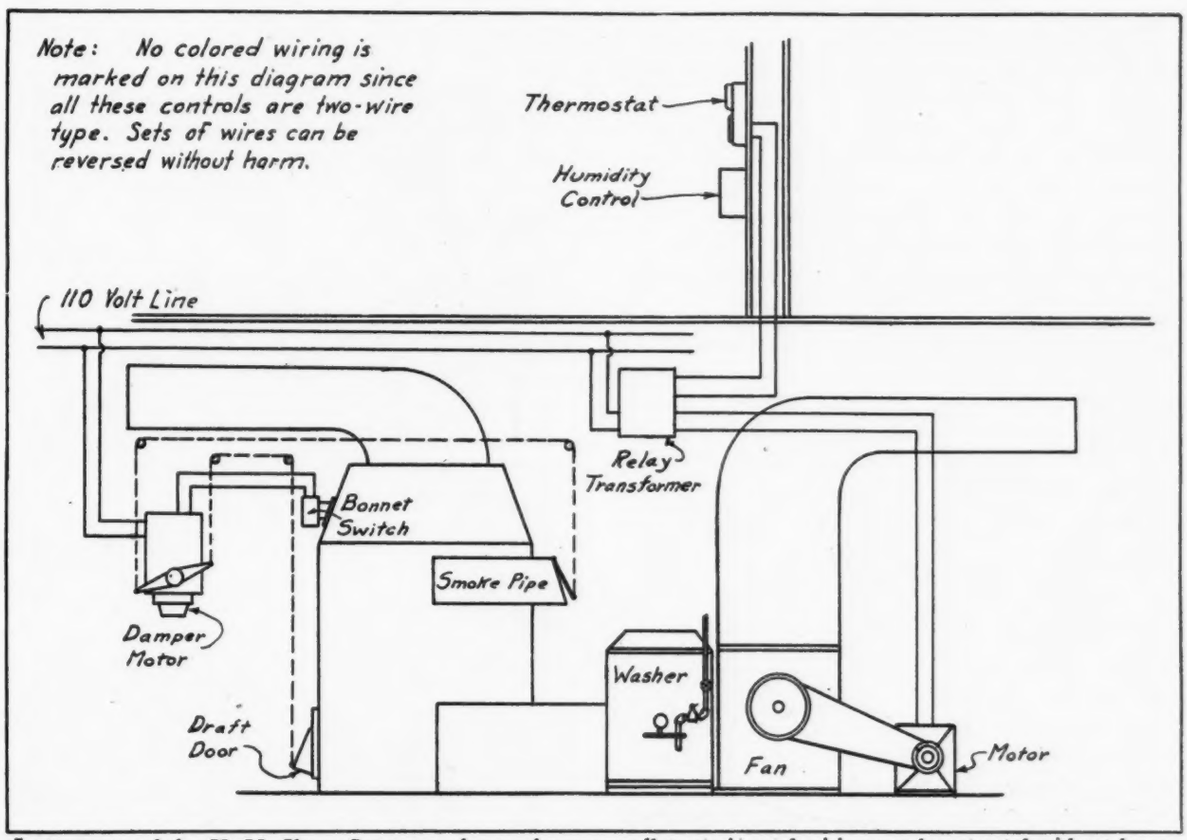
The diagram above shows instruments of the Penn Electric Switch Company. All instruments are two-wire and either complete high or low voltage. The bonnet stat maintains a predetermined temperature in the bonnet at all times while the room thermostat starts and stops the fan. On this wiring one lead is "hot" while the other is the "ground."



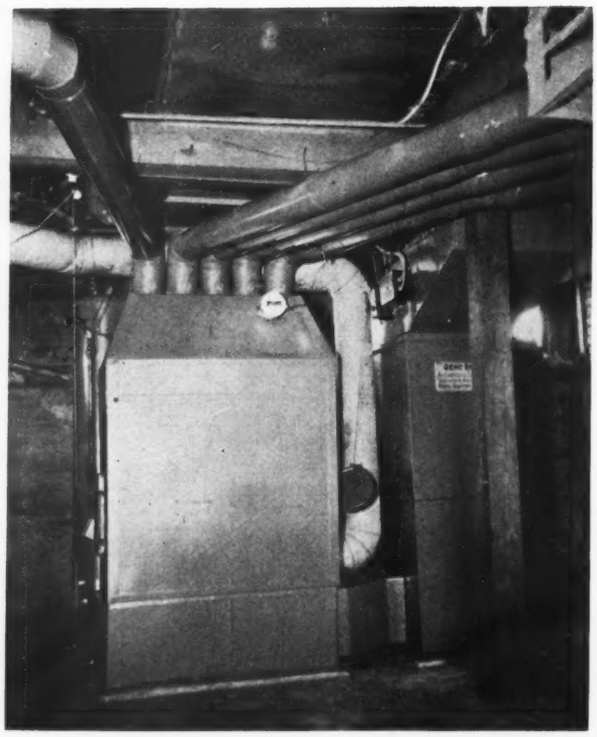
The Stat-Amatic Instrument and Appliance Company controls, shown above, require an inter-connection between instruments of a cable carrying line voltage. There are also low voltage leads of colored wire as shown. The dual thermostat is for day and night operation and works through a time switch. The damper motor and fan motor are high voltage while the rest of the instruments are low voltage using three-wire cable.


Note: M-53 Optional - Purpose is to prevent fan operating when furnace is cold and thus prevents circulation of cold air.
M-51 Closes drafts when excessive bonnet temperature is reached.
All Two wire leads so no color required.
Mercoid Sensatherm (Thermostat)
Humidity Control
Type V Mercoid Transformer Relay
Service Line
Type M 51 Mercoid Control Cut Out High
Type M 53 Mercoid Control. Cut Out Low
Low Voltage Transformer
Smoke Pipe
Damper Motor
Draft Door
Washer
Fan
Motor

The Mercoid Corporation, whose instruments are shown above, strongly recommend the use of a limit control wired into the damper circuit so that any excessive bonnet temperature will cause the damper to close. The company also suggests a fan limit control which prevents the fan running when bonnet air temperatures are too low. All connections are two-wire, high voltage excepting the humidity control which is low voltage.



Instruments of the H. M. Sheer Company, shown above, are all two wire and wiring can be reversed without harm. The room thermostat is the only low voltage instrument in the group. The predetermined bonnet temperature is maintained by the bonnet switch while the fan is started and stopped by the room thermostat.



Above is a photograph of the second test installation and at the right a view of the exterior. The house is in Wisconsin. Six-inch round pipe leaders are used. The furnace is steel; burns coal and showed a phenomenal bonnet temperature pickup. (See text.)

Final Test Observations For A. A's. Second Test House

By Platte Overton

WHAT is a satisfactory installation?

The practical answer would seem to be: "One that satisfies the owner."

Thus it appears that the practical designer will lay out his system to meet the whims, notions or fancy of the owner. One type of owner is frugal. The size of the fuel bill for the heating season will bring his recommendation or his disapproval. Another likes his ease. The size of the fuel bill is secondary if the system eliminates attention, care and trouble. Another has a pet room that has never heated. Warm this room and the contractor's troubles are over.

The installation in the AMERICAN ARTISAN test house No. 2 shown in the accompanying plans and described in the January issue is not a satisfactory system. The fuel bill is too high to suit the owner; the fan is noisy; and there are times when the temperatures in the various rooms vary. With a strong northeast wind, room 103 is too cold for comfort.

Control "Bugs"

The "bugs" that developed when the system was first installed, while practically eliminated, do not tend to help matters. The controls were the original trouble makers. These were changed several times, and are now made up of the parts of several types. Four well known manufacturers of control systems are represented in the installation. We will consider our control system as trouble No. 1. As pointed out in the January article on this test house No. 2, the control system developed trouble immediately. The action of the fan was controlled through the thermostat and a combination bonnet control. The inlet temperature was high combined with a rapid air change. The thermostat was soon satisfied and the fan cut "off." The safety switch cut the fan "in" again within 3 to 5 seconds. The thermostat cut it off in another 2 or 3 seconds. This cycle of "off" and "on" continued for periods as long as 30 minutes.

It was decided that the 2 or 3 minutes necessary to close the draft with the type of control used was too long a period as the temperature in the bonnet might

Room No	Room Use	Reg. size	C.f.m. fan running	Temp. at Reg.	C.f.m. Gravity	Temp. at Reg.
101	LIVING	2-11x8½	387	102° 138°	133 72	100 88
102	DINING	11x8½	210	134°	23	118°
103	KITCHEN	11x9¼	92	124°	26	110°
104	BED RM.	11x8½	210	146°	30	120
105	BATH	11x8½	156	112°	33	118
201	BED RM	11x8½	336	126°	130	145
202	BED RM	9x7	Trace	—	—	—
203	BED RM	11x8½	"	—	—	—
204	LAVATORY	9x7	122	110°	45	108

Abbreviated data sheet showing actual air delivery, register air temperatures for both fan and gravity circulation. Note how results change when the fan stops.

rise 30 to 50 degrees in this interval of 120 to 180 seconds, and the first damper motor was replaced by an electric motor that required but 6 to 8 seconds to close or open. Conditions were improved but not corrected. The thermostat and safety (in the bonnet switch) continued their conflict.

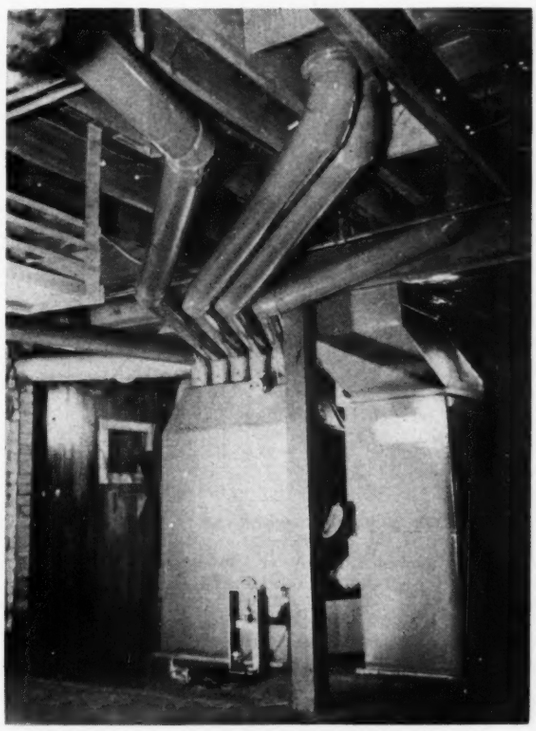
The combination bonnet control was removed and a fan control operating entirely from bonnet temperature was installed. The change kept the fan in operation after the thermostat was satisfied but resulted in some overrun of room temperature. However, the former method had resulted in overrun of basement temperature and the change resulted again in improvement, but not in satisfactory solution of fire or room temperature control.

Equipment Troubles

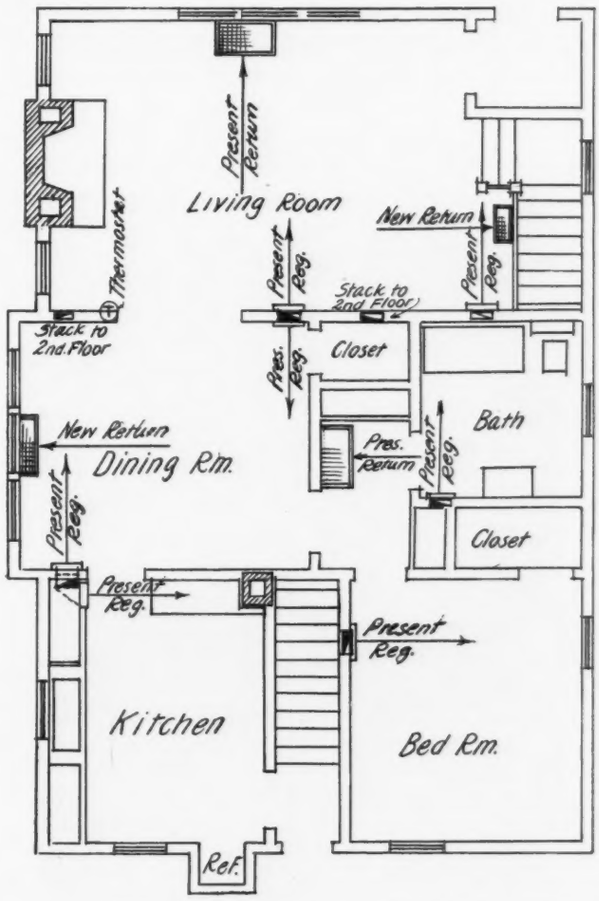
To the above outlined "bugs" were added relays that buzzed loud enough to be heard on the first floor; relays that stuck open or closed; transformers that didn't transform, and other troubles that might develop on any system any time, but seemed to congregate on this one installation. Eventually these various faulty instruments were weeded out but not until the owner was ready to throw the entire system out.

Trouble No. 2: The basement overheated. This was due to lack of insulation in the casing, the action of the control system, type of heater used, high draft and a high percentage of volatile matter in the fuel used.

The casing was insulated with one inch of air cell asbestos. This insulation was not applied until late in the heating season, and no doubt accounts for a liberal percentage of the fuel waste.



Another view of the furnace showing method of putting leaders into boots, flat returns and at the extreme right the leader which reversed when the fan stopped.



Floor plan of the first story. The register in the center of the living room is the one which reversed. The stairs seemed to act as a flue to give some gravity flow for the other register. All registers remain as in the original gravity plant.

It was the writer's contention that this "waste" heat helped to keep the floors warm, hence was not lost. This is true in some measure, however, maintaining 80 degrees in the basement to keep floors warm results in waste. Again, the floors are for the most part covered with thick rugs, and if these floors were below room temperature it is doubtful if any "cold 70" could be traced to them.

The house is located on a hill and there is no protection on any side. There are 20 storm sash, or storm doors. The glass area is high in ratio to outside wall, the sash are loose in the frames, and the infiltration is high. There is no wall or ceiling insulation of any description and the fireplace exhausts a considerable volume of air from the living room with the damper closed.

An all night test early in the season (see January issue) resulted in remarkable findings for over-all efficiency, but the mean temperature for the season has been below normal, and when the exceptional results were obtained the writer was the fireman. The con-

tractor is in no position to furnish an experienced fireman with every installation.

It was apparently a mistake to assure the owner that his fuel consumption would be low. This test house No. 2 with 8 average rooms and bath, required as much fuel for the heating season as test house No. 1 with 18 rooms. It must be remembered, however, that

The living room gives a good idea of the furnishings. On the mantel is our time recording thermometer. The controls are alongside the arch door.

house No. 2 is 75 miles north and 30 miles west of house No. 1.

Fan and Motor Troubles

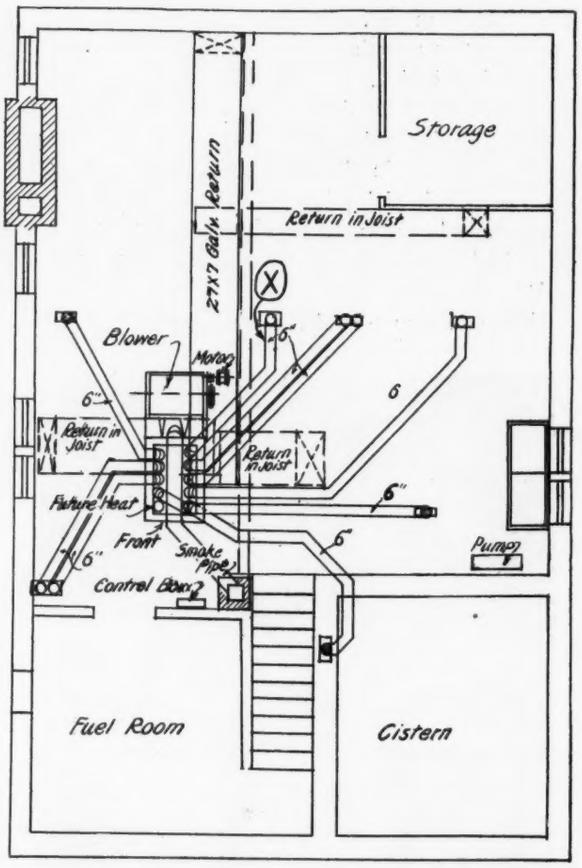
The fan and motor are not as quiet as they should be. After the installation was made, it was found that the concrete floor to which the fan and motor were anchored was hollow. The designer cannot use this hollow floor as an alibi. He should have inspected the floor for this item. A hammer and one or two minutes of tapping on the floor would have shown the necessity of moving or changing the position of the conditioner.

The tip speed of the fan is too high, and the result is audible air noise. From the standpoint of good distribution and equal and uniform temperature range, practically every register is located in the wrong position. Those located properly are handicapped by being at the baseboard in place of 6 or 7 feet up. A rapid air change is necessary in cold weather due to the high infiltration and large glass area, and the fan was speeded up beyond the recommended tip speed. In an attempt to offset the poor location of the registers, additional returns were installed. These returns were wasted as previously pointed out.

Gravity Action

One of the most interesting items that developed during the period of the test was the gravity flow in the various runs. One leader in particular refused to develop any gravity flow during the "off" period of the fan. In fact, this run reversed and acted as a return. This run is the shortest on the system. It has ample elevation; more than one inch to the foot, and fewer elbows and fittings. It terminates in a register in the living room, and this register is in a position that would seem to eliminate any negative or low pressure area. It is the last run that the average furnace man (or the writer) would select, if asked to guess which run might develop a back draft.

It is the run to the east register in the living room, and is marked with a X on Basement Plan. This register is double, but is cut off by the register valve on the dining room side. There are times when all the leaders, including this one, work on gravity, but during



Basement piping plan showing run X which reversed on gravity. When the fan stopped so did air flow through all returns despite their apparent shortness. Some stacks are served by two 6-inch leaders.

the test this run acted as a return within a few seconds after the operation of the fan had ceased. One member of the testing crew suggested a heat "robber." It was installed as shown in Fig. 2. It failed to stop "breathing," but this robber did increase the c. f. m. for

(*Continued on page* 44)

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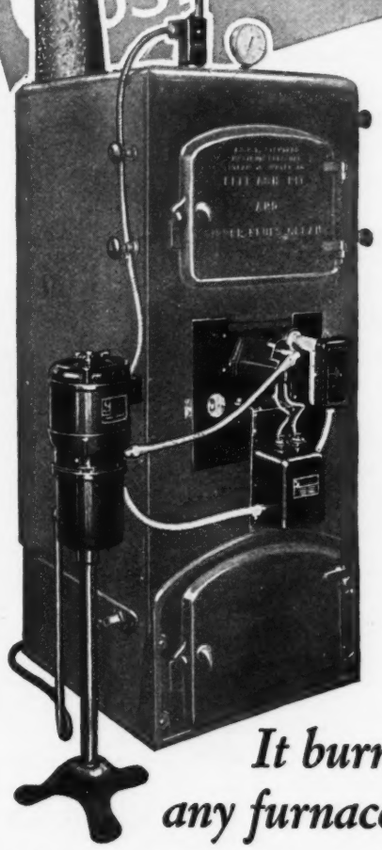

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Comfort Cooling With Attic Ventilating Fans [Part II]

In the April issue the authors of this paper outlined the reason behind this investigation of attic fan ventilation for cooling. In this issue the results of the various tests are explained accompanied by charts showing just what takes place. The results indicate that there is a definite place in the cooling program for this type of application, especially for the owner who cannot spend much money or who wants to keep his cooling costs down.

By G. B. Helmrich and G. H. Tuttle*

ON the previous night, that of June 26, the fan was not operated; natural ventilation was depended upon to reduce the inside temperature. The curve for natural ventilation, shown in Fig. 5, indicates a very slow drop in indoor temperature in the early evening hours, when interpreted in terms of the actual temperature curves for June 26 as they appear in Fig. 4.

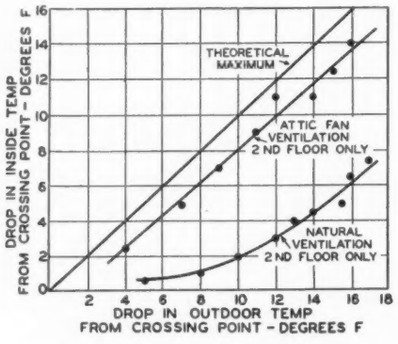

DROP IN INSIDE TEMP FROM CROSSING POINT - DEGREES F
DROP IN OUTDOOR TEMP FROM CROSSING POINT - DEGREES F
THEORETICAL MAXIMUM
ATTIC FAN VENTILATION 2 ND FLOOR ONLY
NATURAL VENTILATION 2 ND FLOOR ONLY

Fig. 5—Relation between inside and outside temperature drop following the point at which the temperatures coincide.

Since the actual maximum drop in indoor temperature was less than half as great as that for the outdoor, and also less than half as much as the drop in inside temperature on the succeeding night when the fan was used, it seems fair to conclude that, in this installation at least, natural ventilation is only about half as effective in reducing inside temperatures as is the case with fan ventilation.

This contrast is even more striking if consideration is given to the fact that, on the night the fan was used, both the day and night outdoor temperatures were considerably higher than obtained on the previous night when natural ventilation was employed. It should be pointed out, however, that in this installation, there was no opening into the attic, except through the ceiling grille, exhaust duct, and fan, so that natural ventilation

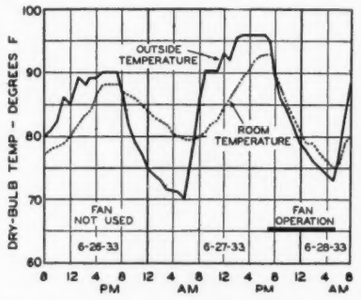


Fig. 4—Effect of centrifugal attic fan ventilation upon the temperature of an upstairs room

was not aided by the stack effect of the structure, whatever real value that may have. The temperature records alone do not indicate the entire cooling effect produced. There was also a very noticeable air movement set up which decidedly augmented the temperature reduction.

Another illustration of the effectiveness of this fan is the comparison of bed room temperatures affected by the fan with the temperatures of another bed room not connected to the fan. This comparison is shown in Fig. 6. The unventilated bed room has a northeast exposure while the ventilated bed room has

*Engineers, The Detroit Edison Co., Detroit. *Paper presented at 40th Annual Meeting of A. S. H. V. E.*

a northwest exposure. It will be seen that the temperature curve for the ventilated bed room drops below the curve for the unventilated room, even though in both cases it starts from a much higher maximum.

Although the occupants of the room reported that the diffusion of the air drawn through it was quite sat-

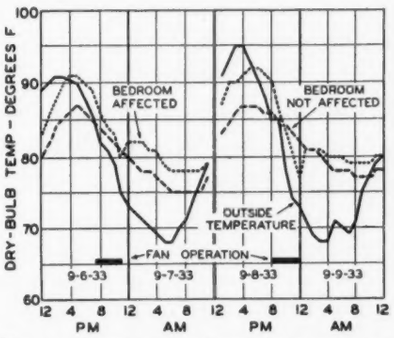


Fig. 6—Comparative temperatures in two similar bed rooms, one affected and the other not affected by attic ventilation.

isfactory, it was decided to check this diffusion by moving the thermometer to various parts of the room on succeeding nights. The thermometer was located in the position shown in Fig. 7 when the temperatures were recorded which are shown in Fig. 6. When the temperatures shown in Fig. 4 were recorded, the thermometer was located near the center of the room. Other locations were tried from time to time, and, except for the location near the ceiling grille, the recorded inside temperature drop showed very nearly the same relationship to the outdoor temperature drop in each case. This indicates a much better diffusion than was at first thought possible.

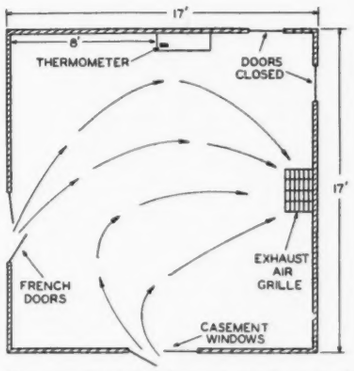


Fig. 7—Distribution of air in a bed room ventilated by an attic fan.

Propeller Fan: The propeller fan shown in Fig. 2 has a capacity, as determined by an anemometer, of about 3000 c.f.m. when pulling air through the three bed rooms. This is equivalent to about 37 changes of air per hour. Under these conditions the static pressure of the fan is 0.038 inch of water. As the fan was operated over shorter periods than was the case with the centrifugal fan, the bed room temperatures did not fall nearly as far, but during the rather short periods of operation, usually from about 8 to 11 p. m.,

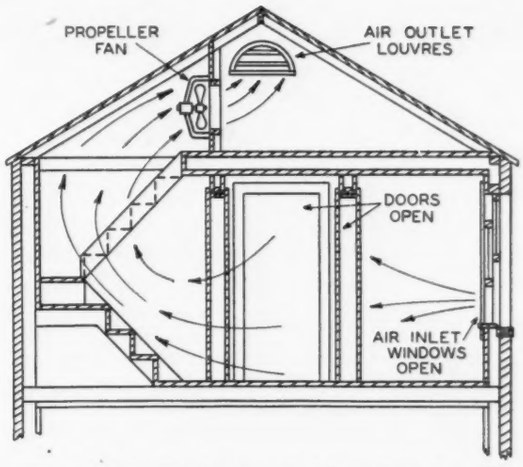


Fig. 2—Propeller fan installed in attic stair well

the cooling effect was just as pronounced, as is evidenced by the curves shown in Fig. 8. It will be noted that, during the fore part of the evening of September 6, the fan was used to pull air through both the downstairs and upstairs rooms. When operating in this manner air was pulled through the downstairs rooms and up the stairway at the rate of about 10 air changes per hour, while at the same time air was drawn through the bed rooms at the rate of about 20 changes of air per hour. The break in the upstairs indoor temperature curve indicates the point at which the downstairs windows and doors were closed, and from that

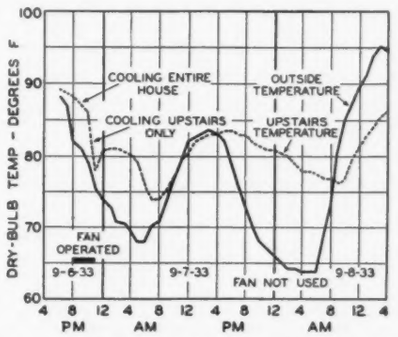


Fig. 8—Effect of propeller attic fan ventilation upon upstairs temperatures.

time on the air was drawn through the bed rooms only.

The rather sharp rise in indoor temperature, which takes place after the fan is shut down, is characteristic of these installations, and is undoubtedly due to the heating effect of the walls and ceiling. The inside temperature drop obtained when natural ventilation was used seems to bear about the same relationship to the temperature drop produced by the propeller fan as that obtained with the centrifugal fan previously described. When the fan was not used, the attic door was kept open as before, consequently the stack effect of the structure could be utilized. Although there was a noticeable natural draft up the attic stairway, the cooling effect produced was in no way comparable to the results obtained when the fan was operated.

On several occasions the fan was used during the

(*Continued on page* 42)

What Is This Thing Called "Comfort"

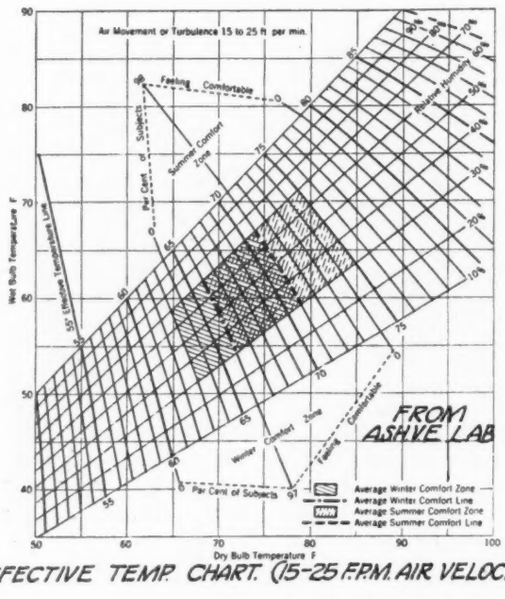
By A. P. Kratz
Research Professor
Department of Mechanical Engineering
University of Illinois

In this article in his series, Professor Kratz deals with that elusive factor in air conditioning—relative humidity. How much water must be evaporated, how much humidity can we carry without condensation, how can the humidity percentage be increased are explained in simple language and by charts.

MEDICAL opinion concerning the physiological effects of atmospheres of low relative humidity is not entirely unanimous and some authorities claim that for normal individuals any direct relation between relative humidity and health has not been definitely proved. Hence it appears that comfort affords the best argument in favor of adequate humidification. At any rate, comfort seems to offer the most tangible standards of measurement. From the comfort chart in Fig. 5 it may be observed that, with a dry-bulb temperature of 72 deg. F., a change in relative humidity from a value of 20 per cent to one of 50 per cent represents an increase in effective temperature of only 2.0 deg. F. No saving in fuel resulting from increasing the relative humidity can be demonstrated. While it is true that an increase in relative humidity permits the use of somewhat lower dry-bulb temperature to maintain the same effective temperature, thus representing a potential saving in fuel, the additional heat required to evaporate the water almost exactly offsets the saving effected by the decrease in air temperature. Hence the importance of humidification has been to a certain extent overrated.

Since the recommendation of 40 per cent relative humidity is usually regarded as conservative, the implications involved in the maintenance of this amount may well be examined. The amount of infiltration of outdoor air into the average well built house without weather-stripped windows amounts to approximately one air change per hour. Figure 17 shows the weight of water required to be evaporated in order to maintain various percentages of relative humidity in 10,000 cu. ft. of space for different outdoor temperatures. From these curves it may be observed that it required 11.5 gallons of water per 24 hrs., in order to maintain 40 per cent relative humidity in 10,000 cu. ft. of space when the outdoor temperature is zero. A medium

(*Continued on page* 38)



EFFECTIVE TEMP. CHART. (15-25 F.P.M. AIR VELOCITY.)

Fig. 5—This commonly used Effective Comfort Chart was prepared from the experiments discussed in the February and this issue. On the chart two zones of comfort—one for winter, the other for summer—were plotted (shaded areas). These zones show the ranges in temperature, humidity and velocity of air where the most subjects felt comfortable.

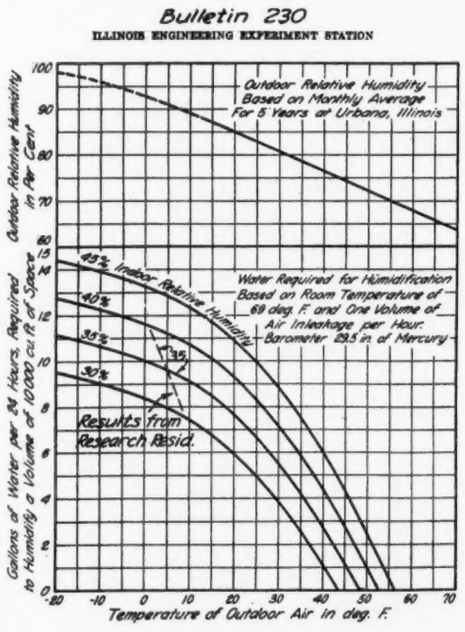

Bulletin 230
ILLINOIS ENGINEERING EXPERIMENT STATION
Outdoor Relative Humidity Based on Monthly Average For 5 Years at Urbana, Illinois
Outdoor Relative Humidity in Per Cent
Water Required for Humidification Based on Room Temperature of 68 deg. F. and One Volume of Air Infiltration per Hour. Barometer 29.5 in. of Mercury
45% Indoor Relative Humidity
40%
35%
30%
Results from Research Resid.
Gallons of Water per 24 Hours, Required to Humidify a Volume of 10,000 cu. ft. of Space
Temperature of Outdoor Air in deg. F.

Fig. 17

This chart shows the amount of water which must be evaporated every twenty-four hours in 10,000 cubic feet of space to maintain different relative humidities at varying outdoor temperatures.

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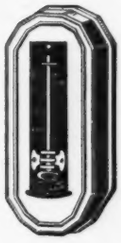

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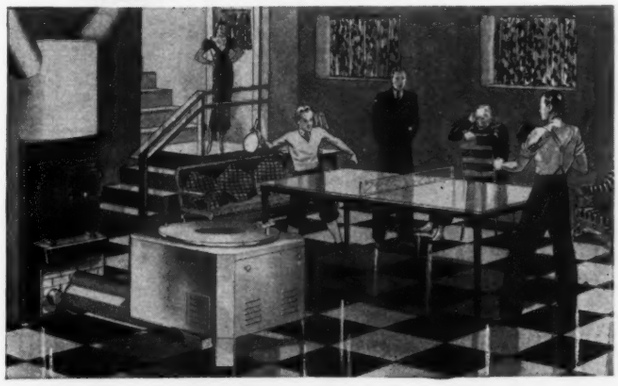

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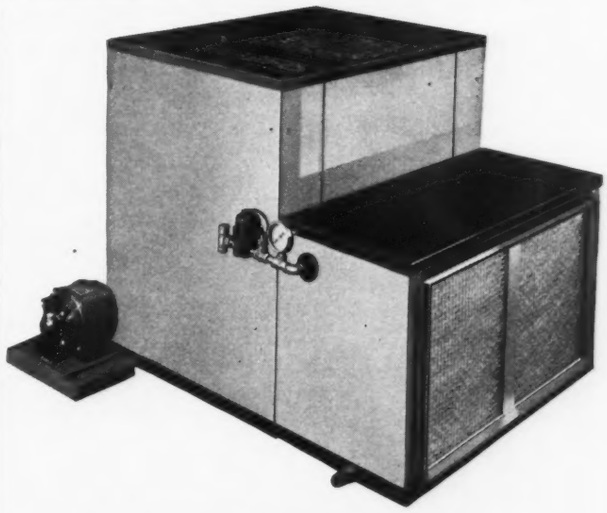

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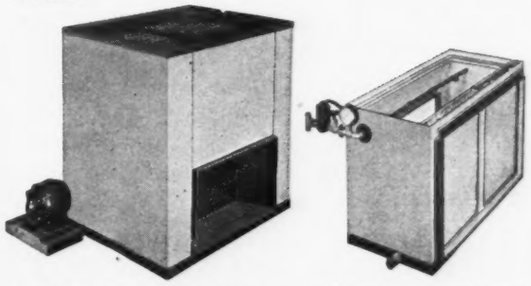

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What Is Comfort? (*Continued from page 36*)

sized residence will contain approximately 15,000 cu. ft. of heated space, and would therefore require evaporation of the order of 17 gal. per 24 hrs. If weather-stripped windows or tightly fitting storm sash are used the air infiltration may be materially reduced and the evaporation requirements may be correspondingly reduced to 8 gal. per 24 hrs. or less. The usual warm air furnace pan will evaporate about 2 gallons per 24 hrs., and under the best conditions will not evaporate more than 5 gallons per 24 hours. A pan placed on the dome of the furnace will, under the most favorable conditions, evaporate as much as 14 gallons per 24 hrs.

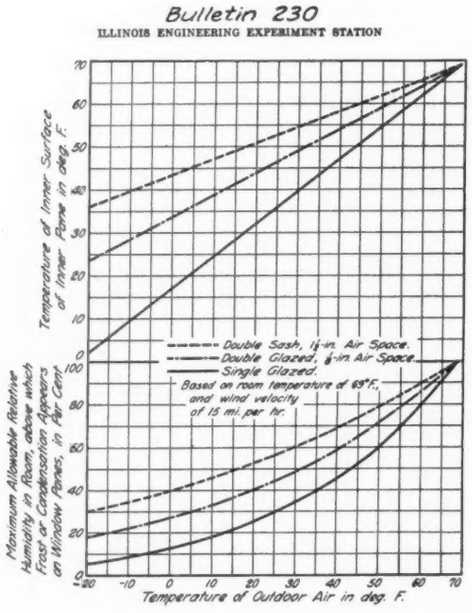
Bulletin 230
ILLINOIS ENGINEERING EXPERIMENT STATION
Temperature of Inner Surface of Inner Pane in deg. F.
Minimum Allowable Relative Humidity in Room, above which Frost or Condensation Appears on Window Panes, in Per Cent
Double Sash, 1½-in. Air Space.
Double Glazed, ¼-in. Air Space.
Single Glazed.
Based on room temperature of 69°F. and wind velocity of 15 mi. per hr.
Temperature of Outdoor Air in deg. F.

Fig. 18

Chart showing percentage of relative humidity carried at which condensation will appear on single glass, double glass, double glazed windows for different temperatures. The upper chart also shows the inside glass surface temperature.

Open pans used in connection with steam radiators will evaporate approximately 0.75 gal. per sq. ft. of water surface per 24 hrs. The evaporation of 17 gal. per 24 hrs. would therefore require 23 sq. ft. of surface, or since the average pan is about 10 in. wide, it would require the equivalent of a pan 27 ft. long. Hence, it is evident that 40 per cent relative humidity can not be maintained in zero weather without some special effort in the design of the heating system or the use of auxiliary apparatus.

If water vapor is present in the air, condensation will occur on any surfaces that have a temperature less than the dew point. Figure 18 shows the percentage relative humidity at which condensation will appear on three types of windows for different outdoor temperatures. From these curves, if 40 per cent relative humidity is maintained indoors condensation will start to appear on windows composed of a single thickness of

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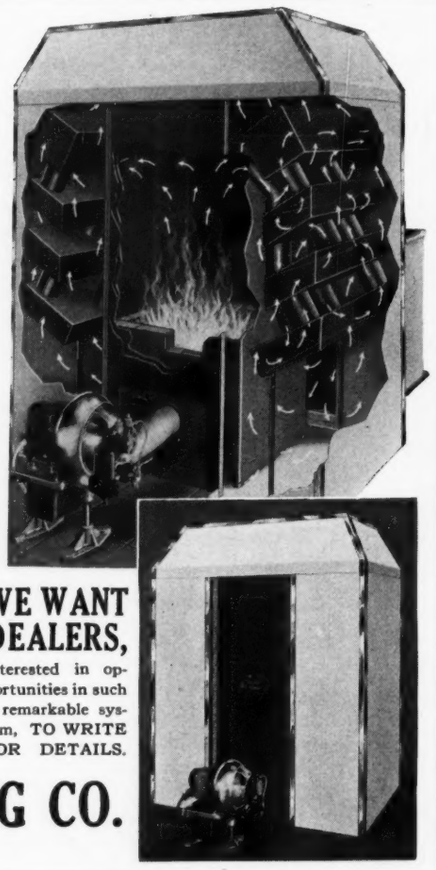

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glass when the outdoor temperature drops to 35 deg. F. If tightly fitting storm sash are used the outdoor temperature can drop to zero before condensation starts. Stated differently, with zero weather outdoors, indoor relative humidity of 40 per cent can be maintained without material condensation if storm sash are used, but not to exceed 15 per cent if storm sash are not used. Where single thickness windows are used without weatherstripping a protective layer of cold air enters through the cracks around the sash that tends to dilute the more humid indoor air at the surface of contact. Hence, it is sometimes observed that less condensation occurs on windows that are not weatherstripped than on corresponding windows that are weather-stripped.

Poorly insulated walls may have surface temperatures sufficiently low to result in condensation when relative humidity as high as 40 per cent is maintained. Even with fairly well insulated walls, if the temperature in the house is allowed to drop materially at night, the temperature of the inside surfaces may decrease to a point that if the furnace is forced the next day enough evaporation may take place in a short period to raise the relative humidity high enough for condensation to occur on the exposed walls. In the case of frame walls, it is practically impossible to have the window frames, baseboards, etc., so tight that no air leakage occurs from the room into the studding spaces. Condensation may then take place on the inside surface of the sheathing, and water may ultimately soak through to the clapboards or stucco.

Humidity Troubles

Since considerable difficulty may be experienced with high relative humidity, it hardly seems practical to recommend 40 per cent for all residences irrespective of their particular features of construction. The lowest line on the comfort chart, 30 per cent, is safely within the limits of comfort, and there is reason to believe that within the proper temperature limits 20 per cent is not noticeably too dry for comfort. Hence, for residences with average construction and not equipped with storm sash, 25 per cent relative humidity in zero weather would seem to be a reasonable value to provide comfort and to avoid some of the difficulties liable to result from attempts to maintain unduly high humidity.

While the theory that the attainment of comfort consists of creating an environment in which the heat loss from the body can offset the heat generated, without the necessity for conscious bodily adjustments, is simple in its conception, it is also evident that a considerable number of factors influence the attainment of this end. Some of these factors are inherent in the design and operation of the heating plant. Most of them, however, are influenced directly by the character of the structure in which the heating plant is installed.

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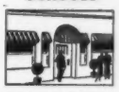
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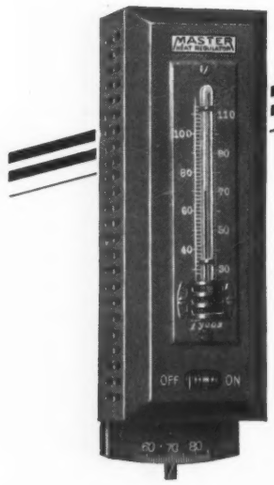

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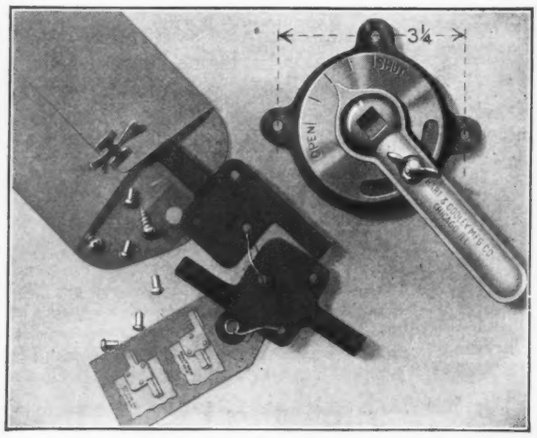

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Automatic Controls

(*Continued from page 27*)

50, 35, 15 degrees, etc., and others in which we can change the differential on the job.

If in this hookup we use a differential of 35 degrees we should realize that our fire will fluctuate between these two settings. As the fire dies down the temperature drops and continues to fall 35 degrees before the draft opens. In this interval our fan can start and stop once or several times depending on the duration of its cycle and it is quite possible that during some periods the fan might run once or twice while the fire was dying down. If the fan "on" cycle was short the fan might blow 115 degree air during one or two cycles rather than air of the temperature we desire.

This statement should not be taken as a bugaboo because it should be quite apparent that in any system where the furnace capacity and fan delivery are balanced the fan will quickly lower the bonnet air temperature any time the fire is low, thus causing the draft to open and in this hookup the fan must stop when the draft opens.

U. of I. Report

In the University of Illinois tests this hookup was tried out and the following facts about the system were established.

During mild weather the bonnet control having a 40-degree differential frequently permitted as many as 15 fan operations between "open draft" periods. In other words, when the fire built up the temperature to say 155 or 160 degrees and the draft then closed the room thermostat might start and stop the fan as many as 15 times before the bonnet air temperature dropped far enough (40 degrees) to cause the draft to open again.

Also, in colder weather a cycle of operation was established where there was one "draft open" period for every running period of the fan.

Further, if the weather was cold and the fire not responsive the bonnet air temperature increase through a range of 40 degrees might require some time, during which the fan could not run but the room temperature continued to drop and in some cases might reach a temperature three or four degrees below the chosen 70 degrees. This naturally resulted in a chilly feeling in the room.

The university then tried a variation in which the differential of the fire control was reduced from 40 degrees to 15 degrees and found this change made several improvements. First of all, the smaller differential caused more frequent openings and closings of the draft door again, as we have pointed out, never letting the fire run away or die away and maintaining a uniform level of combustion.

Conclusions

As a general conclusion we might say that this control system has the following good and bad features:

1. The system is *not* suitable for a furnace with poor draft, poor heat delivery, or under the care of a poor or careless fireman.
2. With a limit control, having a wide differential the flue gas temperature may reach a temperature indicating too much fire acceleration and the production of needless heat.
3. If the fire is not responsive the furnace may require a considerable length of time to raise the bonnet air temperature through a differential of as much as 40 degrees. In the meantime the room temperature continues to drop and may drop to a "chilly" region.
4. As in variation number one this system which maintains a level of bonnet air temperature at all times may result in the production of heat which is not called for by the room thermostat.
5. Under conditions in 4, the rooms having gravity action will be overheated, the basement may be overheated, or a waste of fuel may result.
6. The owner must make changes in the setting of the fire control as the weather changes. He must raise the fire control setting in cold weather and lower it in mild weather.

For the good features we may say that—

1. Because of the arrangement, under ordinary conditions the fan can start as soon as the room thermostat calls for heat.
2. For climates where continuous cold weather is customary this hookup would give the response required from the fan, will not require too frequent adjustment by the owner and result in satisfactory operation.

These variations of the basic hookup with the fan controlled by the room thermostat and the fire by a bonnet control or a stack control constitute a system which has been tried by contractors, but has not been generally advocated or adopted.

The general idea of having "heat on the shelf" is interesting and invites experimentation where quick response is specified. The conclusions drawn in this discussion emphasize the need for trial if the idea is to be used. If the contractor can be pretty sure that the owner is a good fireman and is willing to make the necessary adjustments according to outside weather and prefers responsiveness despite a chance to waste some heat the idea is worth trial.

It should be determined, however, that the draft is good and the furnace capable of producing heat rapidly and the contractor should be willing to give the system plenty of time for experimentation and be willing to rewire if necessary.

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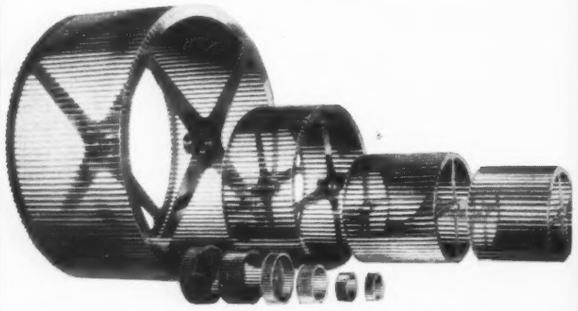

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Control Systems

Attic Fan Ventilation

(*Continued from page* 35)

early evening to ventilate the downstairs, and quite satisfactory results were obtained. To obtain best results, of course, the bed room doors had to be kept closed. The fan was especially effective in removing tobacco smoke from the living room when a group of people were present. If the bed room doors were closed, tests showed that it was possible to pull sufficient air through the downstairs rooms to produce about 30 changes of air per hour. When the downstairs was closed and only the bed room windows were open, there was not enough air movement up the stairway to the second floor to register on the anemometer. This does not prove, of course, that there was no leakage of air into the lower part of the structure, as the anemometer readings had to be taken at a point where the area was rather large. None of the tests, however, indicated that the leakage of air into the structure was serious enough to have an appreciable effect on the cooling and ventilating capacity of the fan.

Centrifugal Steel Plate Fan: The fan assembly shown in Fig. 3 was not installed until the latter part of last summer, consequently reliable temperature data are not available. Capacity tests were made, however, and enough information was gathered to give assurance that the fan was capable of effectively ventilating the three upstairs bed rooms to which the center hall and attic stairs are connected.

On the first test the fan was operated at 390 r.p.m., and anemometer measurements showed an air movement up the attic stairway of about 5880 c.f.m. At this speed, however, there was considerable air noise, and for the second test the fan speed was reduced to 320 r.p.m. At the latter speed the fan handled 5040 c.f.m. up the attic stairway at a static head of 0.11 inch of water. With the downstairs closed up, and the windows open in two bed rooms, the air flow through one of the bed rooms was 1580 c.f.m. and through the other 2600 c.f.m. With the volume of the second floor equal to about 5800 cubic feet this rate of air flow provided about 52 changes of air per hour. The measured air flow through the two bed rooms which were open was 4180 c.f.m., and the difference between this volume and the quantity of air actually handled by the fan can be accounted for by in-leakage of air through windows in other rooms and leakage up the first floor stairway. The air movement up the stairway, however, was not sufficient to register on the anemometer. The leakage and short circuiting of air amounted to about 860 c.f.m., or about 17 per cent of the total volume of air handled by the fan. With this rather high rate of air change it seems certain, considering the experience with the other installations, that this fan will accomplish very effective cooling.

Control of Fan Noise

Since the attic ventilating fan is usually located directly over the sleeping rooms, it is quite essential

that every possible precaution be taken to reduce the fan and motor operating noises to a level which is not objectionable to the occupants of the home. In the case of the centrifugal fan installation, both fan and motor were mounted on a wood platform which was insulated from the attic floor joists by strips of ½ in. sponge rubber, and rubber washers were used under all holding-down bolts. In spite of these precautions, the initial fan speed of 400 r.p.m. proved to be too high for quiet operation, and it was reduced to about 300 r.p.m. It was also found desirable to limit the velocity of the air through the ceiling grilles to about 400 f.p.m. in order to reduce the air noise. Motor noises have frequently proved troublesome, and the capacitor type of motor has been found particularly well adapted to this service because of its inherent quietness.

The propeller fan installation described in this paper was not satisfactory from the standpoint of noise. At the normal operating speed of 900 r.p.m. the blade tip speed was 5000 f.p.m. and the air noise was quite disturbing. For that reason the fan usually was not operated after the occupants had retired for the night. Although strips of felt were placed between the fan casing and the wood studding to which it was bolted, this was not very effective in reducing the transmission of sound through the building structure. Experience thus far indicates that the tip speed of a ventilating fan should not exceed 3200 f.p.m.

Conclusions

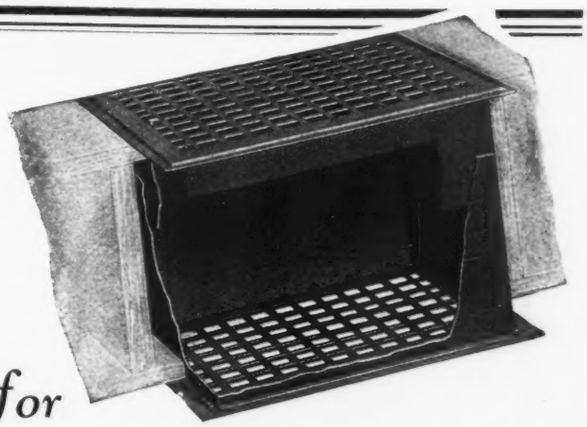
1. It is quite practicable, by the use of either a centrifugal or propeller type attic ventilating fan, to very effectively cool the sleeping rooms in a moderate-sized house.

2. The downstairs portion of the house can be effectively ventilated if the fan is connected to an attic stairway in such a manner that the entire first floor can be placed under suction by way of the first floor stairs. It is not advisable, however, to leave the downstairs open after the occupants of the house have retired, as the flow of air through the bed rooms, and consequently the cooling effect in these rooms, is greatly reduced.

3. Wherever possible, the capacity of the fan should be such as to provide a minimum of about 30 air changes per hour. In very large homes, physical or commercial limitations may dictate the use of a proportionately smaller fan, providing about 20 changes of air per hour. This is still sufficiently high to accomplish reasonably satisfactory cooling.

4. Natural ventilation, induced by the stack effect of the structure resulting from the opening of attic doors and windows, is not nearly as effective in circulating air from out of doors as is an attic fan which provides about 30 changes of air per hour.

5. It seems reasonable to conclude, in the light of the past summer's experience, that attic fan ventilation for residences should prove to be a satisfactory sub-summer season under climatic conditions similar to those in Detroit.



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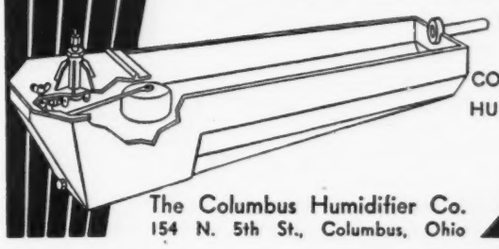

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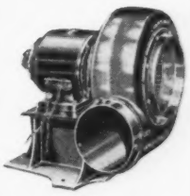

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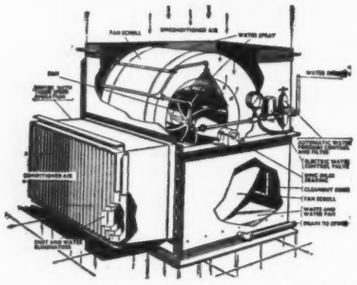

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A. A. Test House (*Continued from page* 32)

this run about 40% while the fan was in operation and raised the duct air temperature about 80 degrees. One of the 6-inch runs to room *201* was cut off, but did not effect the back firing of this one leader.

Fig. *1* is the leader for the west register for room

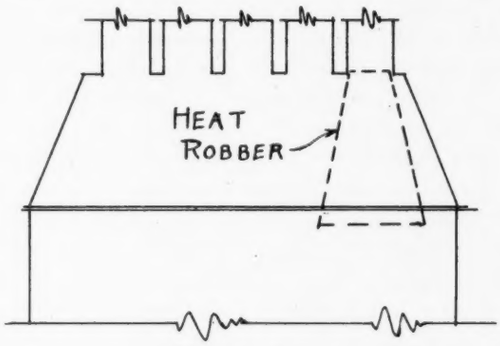

FIG. 2

A heat robber like this was placed on the leader which reversed. The robber increased air temperature and capacity, but did not prevent reversal entirely.

101. This run has three 90-degree and two 30-degree elbows. The temperature drop with the fan running for these five fittings and 15 feet of straight pipe is 12 degrees.

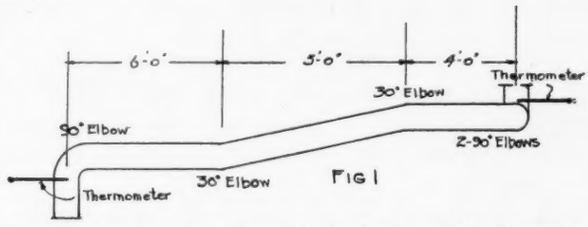

FIG 1

The temperature drop found in leaders is typified by this run. Twelve degrees drop was found between the two thermometers.

Conclusions

Preliminary conclusions suggest these changes:

(a) The heater and conditioner should be removed to the space designated as the fuel room.

(b) The plant should be automatically fired with gas or oil. A stoker is barred due to the fact that the fuel room is occupied and the owner wishes to eliminate the dust and dirt resulting from coal storage.

(c) A larger low speed fan should be installed, possibly one with variable speed. If a high-low flame oil burner is provided, the possibility of a constant air supply with continuous operation of the fan is not to be overlooked.

(d) Storm sash and doors should be placed on all windows as the winter winds in this section of the country are variable.

(e) The warm air conductor from the plenum chamber should be a trunk duct with the six inch branches taken off at the various registers.

(f) The control system should be zoned. One for

(*Continued on page* 51)

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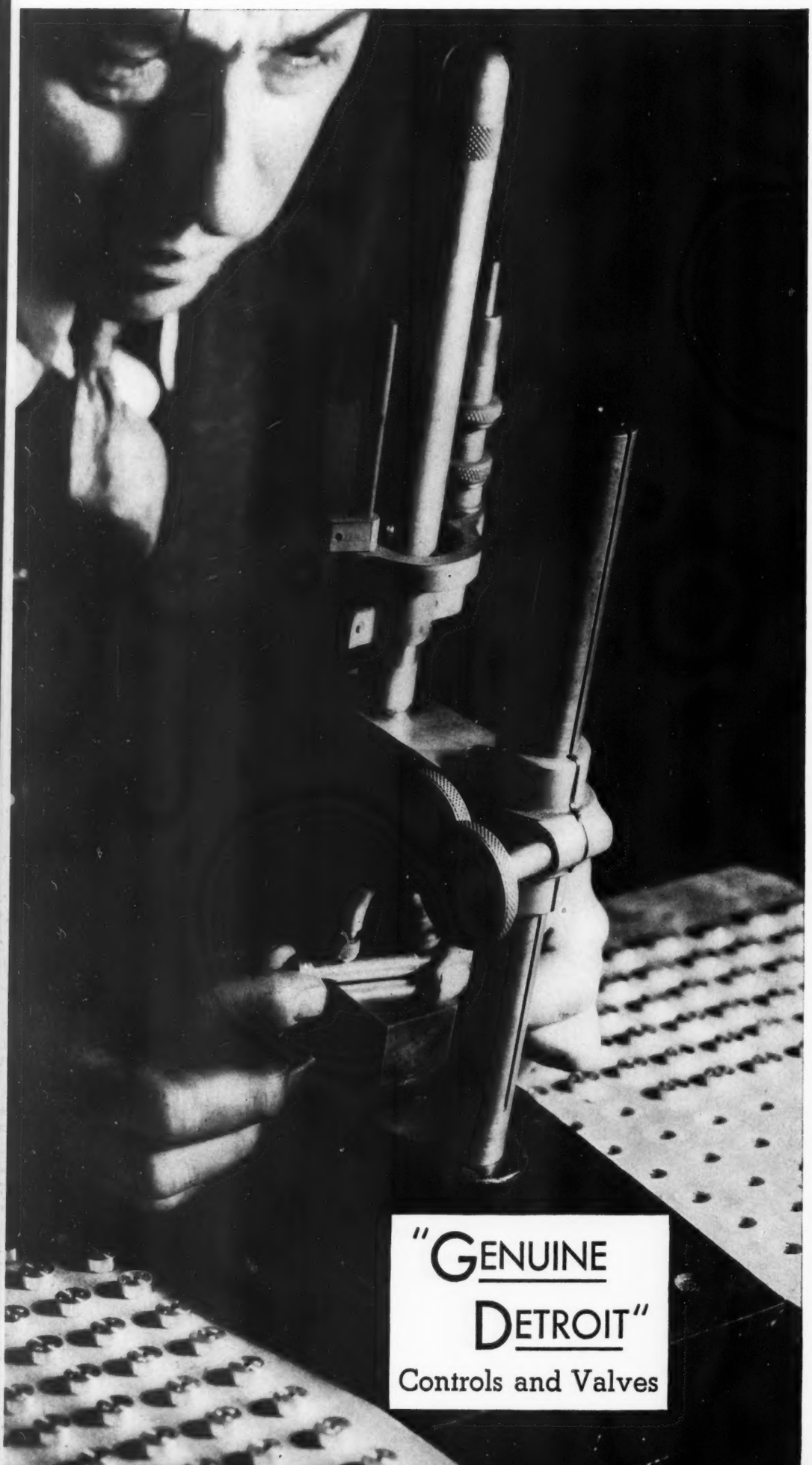

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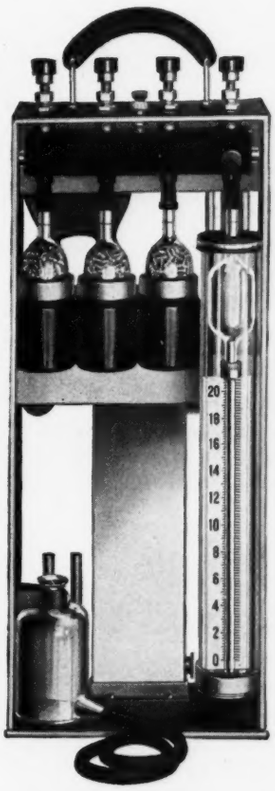
This new gas analyzer is designed to simplify the necessary tests to secure



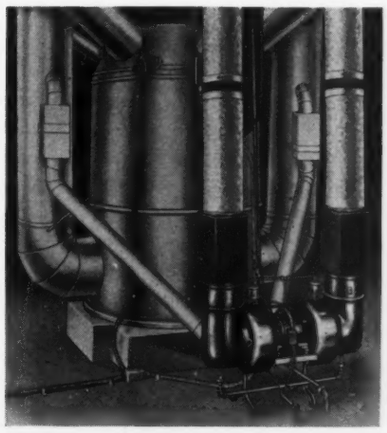
flue gas analyses. Many special features in the way of valves, headers, valve seats, etc., are included in the new apparatus. An exceptionally large scale with large graduations for easy and quick reading is a feature of the new analyzer.

The bulletin describes the construction and operation of the analyzer in detail and gives full explanation of the features claimed for this apparatus. Contractors wishing information should address the Ellison Draft Gage Company.

▼ ▼

Conditioner

An unusual air conditioning unit combining an oil burner and a conditioner is announced by Modern Manufacturing and Engineering, Inc., 317 Western Avenue, Davenport, Iowa.



As shown on the illustration, a gun-type oil burner is supplemented with an air washing and humidifying bowl and the oil burner fan also blows air through an air circulating tube into the furnace jacket. The machine is designed for installation at the rear of any furnace. Air is drawn down the cold air returns into the washing bowl, through a spray of water in the bowl, over wash boards and plates, then through the burner blower and into the furnace casing through the recirculating tube.

The unit has a capacity of 1,000 or 2,000 c.f.m. and uses a ⅙ h.p. motor. The photograph shows a typical installation using a double unit with two blower wheels and two leads into the recirculating system.

The manufacturers state that the unit can be installed at a price close to that of the oil burner unit alone. Literature describing the unit has been prepared and will be mailed to any one requesting copies.

◆

Conditioning Furnace

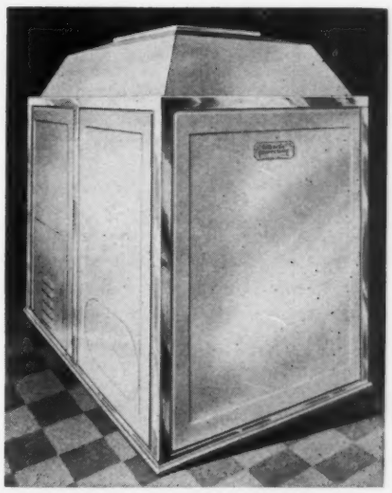
The Gilbert & Barker Manufacturing Co., Springfield, Mass., announce the "Gilbarco," a new combination warm air furnace unit, complete with oil burner and all accessories.

Interesting features claimed for the unit are: An air-cooled jacket, polished metal base and frame, 16-gauge steel panel for sides.

The furnace is steel construction with 16-gauge, welded-steel radiator and ground-joint connections to the combustion chamber. The combustion chamber is one-piece and has vertical fins for rapid heat transfer. No packed or cemented joints are exposed to the fire.

Humidification is accomplished through a gravity vaporizing, electrically controlled unit.

A "Gilbarco" S-1 model burner with a consumption of ¾ to 1¾ gallons per



hour and producing up to 150,000 B.t.u. output is used.

Full information may be obtained from the company.

◆

Small Welders

A line of midget spot and butt welders, with a capacity of two pieces of 20-gauge metal, operating on 110-volt alternating current, is announced by Weldex, Inc., 9666 East Jefferson Street, Detroit, Mich.

The spot welder is 12 by 12 inches in size and weighs 30 pounds. Designed primarily for home use, it can also be used for welding light gauge sheets. A special attachment has been designed making the unit a butt welder welding up to 3/16 inch steel.

The company also makes a heavier model capable of making up to 300 welds per hour.

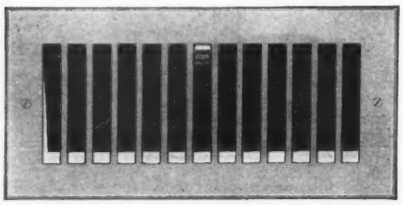
Full information has been compiled in a leaflet showing the unit and giving full details of construction, operations and prices. Copies of the leaflet may be obtained from the company.

New Products . . . . . .

New Grille

Hart & Cooley Manufacturing Co., 61 West Kinzie Street, Chicago, announces a new grille to be known as No. 60. This grille rounds out the line of forced air grilles Nos. 30, 40 and 50. The design embodies oblong holes with narrow bars as shown in the illustration. The openings are 21/32 inch wide and the width of the bars is 3/16 inch.

This construction is said to result in an unusually large air capacity. On



all heights above 8 inches a row of cross bars is placed in the center of the grille.

The complete H & C line of forced air registers, including both 1- and 3-piece sidewall and baseboard registers, also return air grilles, are available in this new design.

The Hart & Cooley Manufacturing Co., also announces a new close-mesh "No-Flex" cold air face, No. 266, especially designed for stores and other public buildings. The openings are 5/16 inch wide.

Full information on the new grilles may be obtained from the company.

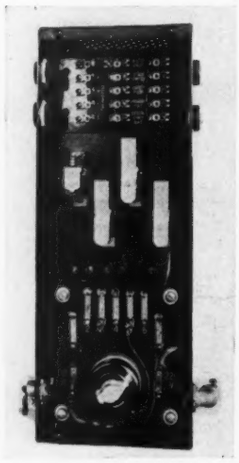
◆

Control Panel

A complete control panel for air conditioning systems containing a motor capacitor, a speed control transformer for the motor, a transformer for low voltage supply for relays and valves, terminal boards and summer-winter switch, is announced by the Holtzer-Cabot Electric Co., 125 Amory Street, Boston, Mass.

Excellent results are claimed for the unit on gas operation with a variable speed motor. When the room calls for maximum heat the control opens primary and secondary gas valves and runs the fan at high speed. When less heat is needed the secondary gas valve is closed and the fan goes on low speed. Control over humidity is maintained at the same time. When the room requires no heat, the opening is closed off entirely and the fan further slowed down to a speed just sufficient to maintain air balance. The control unit is available for single phase motors in all fractional h.p. sizes and practically all ranges of speed.

All parts are electrically connected together and terminals are properly

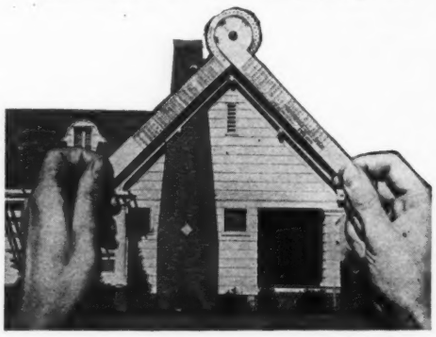


marked for connection to outside apparatus. Complete flexibility for various wiring systems and different pieces of apparatus is claimed.

◆

Roof Pitch Indicator

The Packard Service Bureau, Davenport, Iowa, are introducing to the roofing trade a pocket instrument known as the roof pitch indicator. Two scale arms, carrying all the tables required to give the answers to problems of slope, area, etc., are hinged at a scale which is set as shown in the illustration. By holding the instrument before the eye and moving the



arms the proper pitch is determined. Several common problems can be answered by using the instrument. By holding the scale as shown in the illustration the pitch—rise to running foot—can be determined from the ground. Having the pitch, scales on the instrument give the roof area of any particular building by knowing the ground dimensions. The length of a hip or valley rafter for a building can be determined and the plumb cut or miter for a rafter can be laid out.

Oil Burner

Scott-Newcomb, Inc., St. Louis, are offering the S-N Junior burner, containing the following features:

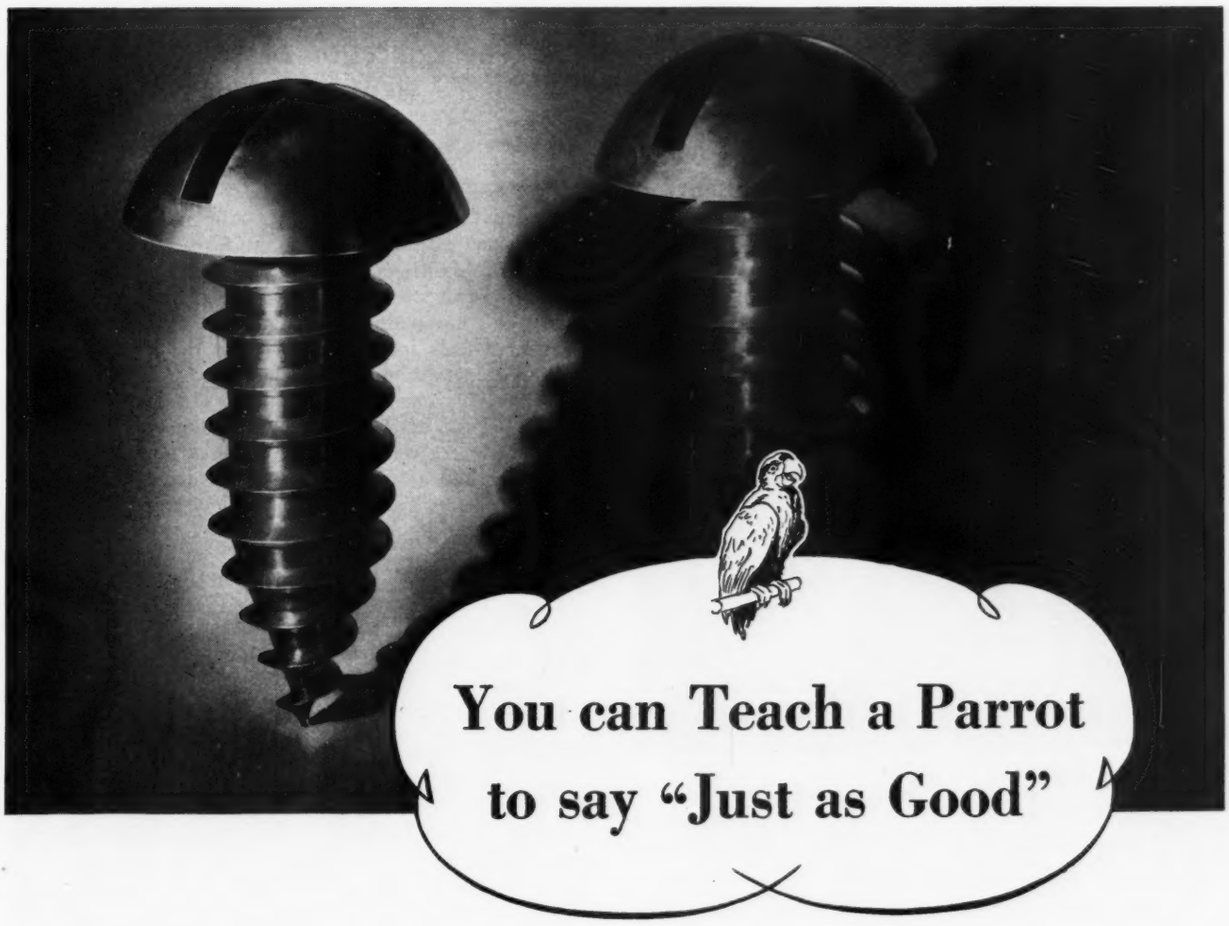
The electric motor operates in a vertical position. The motor uses ball bearings. The end plate of the motor is attached to a "sump" which is always partly filled with oil. In this sump, and directly operated at motor speed, is a rotary air compressor and a piston type valveless oil pump. The oil and air mixture is delivered at about 1½ lb. pressure through ½" copper tubing to the spray nozzle

head, which head is mounted in a special casting held by set screws applied to the firedoor of the furnace. If there be any leaks in the oil pump, the leaks go into the sump and cannot drip out on the floor because the sump is oil tight. Air for the intake of the air compressor is drawn through an air filter located between the motor and

the sump. Burner can be applied to any existing heating plant.

The area of the spray nozzle orifice in this burner is 110 times the area of a pressure atomizing burner of the same capacity, and this permits, together with other details of design, using heavy fuel oils, even as low as 12-16 gravity, without the need or use of screens or filters. This job can use crankcase drainings.

The installation of the burner is extremely simple. A few broken firebrick are thrown on the grates—the nozzle head support plate is attached in the firedoor opening, as shown. After the nozzle head support plate is secured in place, a sheet metal cover fits on to the support plate and is held by screws to cover the entire door opening, after which the nozzle head and transformer are quickly attached in place.



But USE shows "Just as Good" to be bad advice when buying screws for assembling sheet metal

Put an imitation alongside a genuine Sheet Metal Screw and you might be fooled into believing the imitation to be "Just as Good". Both have hardened threads. They "look" alike under casual inspection.

However, "Just as Good" is found to end with appearance. USE shows the difference between *genuine* Sheet Metal Screws, made only by Parker-Kalon, and the imitation. It leaves no doubt as to which screw actually saves time and labor . . . which one merely looks as though it will do the work and cut costs.

Genuine Sheet Metal Screws effect savings and make better fastenings, not because of their "looks" or hardened threads, but because of the way they are made and what they are made of. They always go in easily and quickly . . . always form a perfect, strong-holding thread . . . always draw up tight without breaking. It is that *perfect action* which gives uniformly satisfactory results and cuts costs.

How to Tell Genuine Sheet Metal Screws

★ MADE BY PARKER-KALON, originators of the Sheet Metal Screw and possessors of unique equipment, specially developed to make these Screws.

★ THEY HOLD . . . because the threads run full diameter right up to the head. ★ THEY GO IN EASILY . . . because the threads are (1) designed with an expert knowledge of the work they must perform (2) held to a high degree of accuracy and uniformity. ★ THREADS DON'T STRIP . . . HEADS DON'T TWIST OFF . . . because they are made from high grade steel wire of special analysis and are scientifically hardened by a process developed from 20 years' experience in the manufacture of Self-tapping Screws.

PARKER-KALON
HARDENED TYPE A SELF-TAPPING
Sheet Metal Screws

PARKER-KALON CORP.
190 Varick St., New York, N. Y.

Sold only through Recognized Distributors.

★

MAKE MORE

MONEY ★In the shop

★On the Job ★When you sell

THERE is three-way profit for you when you sell ARMCO SHEETS . . . At the point of sale because Armco INGOT IRON has been advertised and accepted nationally for 20 years as the foremost low-cost, rust-resisting sheet metal . . . In the shop because Armco INGOT IRON is soft, uniform and free-working. It cuts labor costs and helps you turn out neat, tight work. And Armco INGOT IRON measures up to the job because it goes in fast and pleases your customers, not only when the job is done but for a long time afterwards. Start using Armco INGOT IRON. See how much easier it sells and satisfies people—with the help of the many sales aids that ARMCO Distributors offer. Your distributor salesman will explain the whole money-making plan. Ask him about it next time he calls.

THE AMERICAN ROLLING MILL COMPANY

Executive Offices. Middletown, Ohio

ARMCO

THE SHOP-SAVING IRON THAT SELLS EASIER

The Education of a Moujik

By IVAN NITCHEVO

Chapter III

THE Boss looked up and frowned when he saw Feodor. This Russian was quite a problem to the proprietor of the Apex Shop. He was too good a mechanic to lose, but under present conditions, he had been unable to pay him his full wages every week. The other men in the shop had been accepting less than the regular scale for a long time, but the Boss had been reluctant to ask Feodor to work for less money, fearing he would quit. He therefore, adopted the expedient of paying him only part of his wages each week. As things now stood, Feodor had a substantial balance due him and the Boss was getting deeper in debt each week.

Feodor also was worried about this arrangement. He wanted his money. So he decided to ask for it. The Boss at first tried to get him to continue until he could get sufficient work at a profit to pay him in full, but Feodor had seen the trend and he was suspicious of ever getting his money on any such arrangement. So after considerable haggling, the Boss bowed to the inevitable and signed his business over to Feodor.

To placate the other employees, the Boss announced that Feodor had bought him out, which was in a sense true, so they accepted their new employer, and the "Education of the Moujik" really began.

Among the assets of the firm was a membership in the local Contractors Association. When Feodor presented his credentials and announced that from now on he would represent the Apex Shop he was greeted with the usual blatant felicitations, and immediately after the meeting some of the members began to work on him to lay off on some work in which they were interested. This was the introduction of Feodor to the "complimentary bid." He saw at once that it was a sweet chance to get a price for their work and in his trustful ignorance he promised to go along with every one who asked him.

Then he woke up.

What little work he had been getting now went to others.

With no work in the shop and a lot of time on his hands, he decided to change the name of his business to the Apex Air Conditioning Corporation. Then he incorporated the business, and as a final gesture of his Americanization he changed his name to Theodore Rivetts, with the accent on the final syllable.

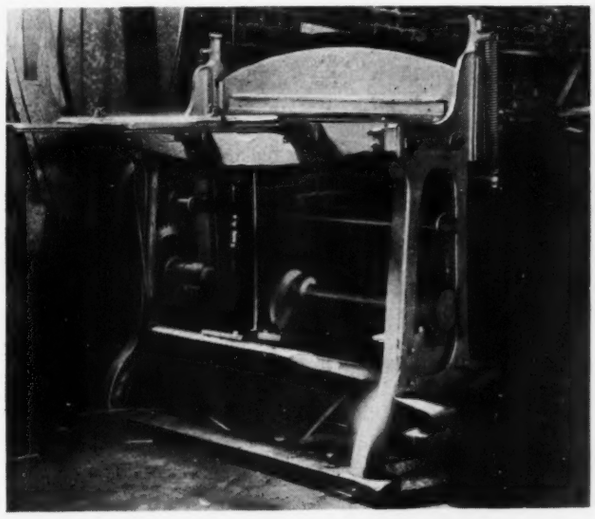
(To be continued)

Kinks . . . .

Practical kinks on methods, special equipment, handy ways of doing things are invited. Kinks published will be paid for at the rate of $1.00 for an item without illustration and $2.00 for items with photographs or drawings.—The Editors.

THE light hand shear found in most sheet metal shops may be cheaply adapted to the use of power by a plan which will not permit overloading, but makes operation easier on large quantities of material.

Two shafts are installed in the frame of the machine, the upper one with simple U clamps to the frame and the lower in boxed bearings. The latter operates a half-moon shaped cam at the middle, over a 3-inch metal roller installed on the treadle



in a bracket. As the rounding edge of the cam passes over the roller the treadle is depressed to make the cut. The cam then drops with the straight edge back of the roller, as shown, releasing the pin clutch near the end of the shaft. A treadle at the right of the machine is connected to a rod across the back, which pushes the clutch in for each cut. A large gear on the end of the lower shaft meshes with a smaller gear connected to the belt pulley on the upper shaft. Speed of the machine is determined by the ratio of these gears J. C. Coyle, California.

A. A. Test House (*Continued from page* 44)

the kitchen, one for the second floor and one for the living, dining and bed room.

From the above remarks it is obvious that the writer is admitting that the solution of the control problem for this job is an unknown quantity. We will mark it X, and call for help from the readers. We invite readers to study the first report on this job (January, 1934, issue) and this second report and send suggestions for tests to be run next heating season.

LET ITS EXCLUSIVE FEATURE

SWELL YOUR PROFITS

The U. S. Steel Warm Air Furnace (patented) is a better profit line. It is a powerful seller because it delivers 50% more heat with 25% less fuel.

And it is a still greater profit line because with the patented Reversible Return Flue Radiator, one model serves for every kind of solid fuel burned, as well as being particularly efficient with Oil and Gas Burners. Hence less display and warehouse space needed—and less capital tied up in stock.

The U. S. Is a Universal Furnace

This is the furnace you have always hoped some one, some day, would find out how to build. Don't delay contracting until your competitor secures the agency.

Genuine Fire Box Quality Open Hearth Steel is used throughout and double electric arc welded into practically one continuous piece.

Progressive dealers who would like to consider joining forces with a progressive manufacturer are invited to write for complete data.

U. S. PRESSED STEEL PRODUCTS CO.

KALAMAZOO, MICH.

COPPER SERVICE

. . . on the spot!

DISTRICT SALES OFFICES

BALTIMORE CINCINNATI NEW YORK
BUFFALO CLEVELAND PHILADELPHIA
CHICAGO ST. LOUIS PITTSBURGH

WAREHOUSES

CHICAGO NEW YORK PHILADELPHIA
CINCINNATI CLEVELAND PITTSBURGH
ST. LOUIS

MILLS AND EXECUTIVE OFFICE
PITTSBURGH

HUSSEY

Things are getting active—and sheet metal plants and shops are hustling—and TIME is getting more and more a factor in every transaction.

Which facts are tremendously important.

Your needs for Sheet Copper and Copper Products are best met by the organization that is *prepared*—ready with On-the-spot service at strategic points.

HUSSEY supports your business activities with a service designed to get you *what* you need *when* you need it—as long as it's copper.

No need to worry or bother about it—we've already done the worrying and planning and we're still building and improving Hussey service. Isn't that worth knowing?—that this old and strong institution is practically at your elbow to give quick, intelligent, continuous service?

If you use Hussey service now, you already know these things. If not, give us a trial—a chance to demonstrate on your next order for Copper.

C. G. HUSSEY & COMPANY
PITTSBURGH, PENNSYLVANIA

LOWER COSTS TELL THE STORY

VIKING

ACCURACY AND SPEED

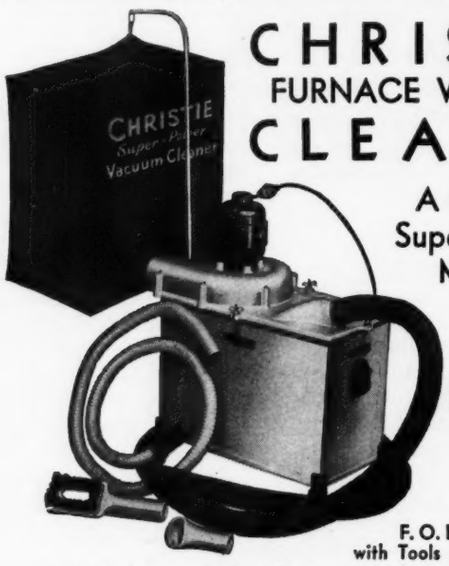
ACCEPT the advantage of ready fitness for all shop requirements as an EXTRA VALUE.

Accept the high quality materials and workmanship in Viking Shears as a premium on your moderate investment.

Progressive sheet metal men everywhere are using Vikings to help cut their path to prosperous business.

Ask for details and they'll be sent you promptly; no obligation.

VIKING SHEAR CO.
ERIE, PA.



CHRISTIE
FURNACE VACUUM
CLEANER

A One-Man Super Powered Machine

$99.50

Subject to Change Without Notice

F. O. B. Cincinnati with Tools and Attachments.

This is the same high quality machine that is known to furnace dealers everywhere as the most powerful, one-man cleaner on the market. Built by practical furnace men.

Quantity production and large purchasing power enable us to make this sensationally low price. Includes tools and attachments. Folder "A" mailed upon request.

We also manufacture the "Christie Giant" to operate from truck or yard.

Sold by Jobbers and Furnace Manufacturers. Write for names of those in your territory.

CHRISTIE CLEANER COMPANY
Division of The Cincinnati Sheet Metal & Roofing Co.
226-30 East Front St. Cincinnati, Ohio
Salesmen: A few choice territories still open.

News Items . . . . . .

To Air Condition 2,000 R. R. Cars

The year 1934 will mark a turning point in the attitude of the travelling public toward the American railroads, according to G. E. Stringfellow, Vice-president of Thomas A. Edison, Inc., who announced recently that more than 2,000 passenger train cars are to be modernized this year with air-conditioning apparatus at a cost of approximately $12,000,000. Several of the leading trunk-line railroads are participating in this program to meet the competition of airlines, buses and private automobiles, he said.

Mr. Stringfellow explained that each modern car has its own generator which operates from the axle while the train is in motion. The electricity so produced is required for lighting and for operating the fans, motors and other apparatus for keeping the air at the right temperature and clean. To provide for continuous operation during stops at stations the generator charges the set of storage batteries with which each car is equipped for this purpose.

◆

J. M. Frank Heads Fan Manufacturers

J. M. Frank, President of the Ilg Electric Ventilating Co., Chicago, was recently elected president of the National Association of Fan Manufacturers. C. A. Booth, Buffalo Forge Company, Buffalo, is the new vice president and E. B. Cresap, Chicago, has been re-elected secretary.

◆

New Furnace Dealer

Atlas-Butler Furnaces, Inc., located at 243 North Fifth St., Columbus, Ohio, has been formed to retail furnaces. M. M. Swepston is president and F. C. Schott is vice-president.

◆

Fuel Costs With Forced Draft

An interesting report of fuel consumption with and without forced draft and with suitable grades of coal for natural and forced draft is given in the tabulation below prepared by the Peerless Electric Co., Warren, Ohio.

The house has five rooms on first floor, entire second floor one large room, used as playroom and is supplied with heat from furnace. The construction of the house is average, with no storm windows or doors.

1929-30 heating season—No change has been made in the furnace from 1929 to 1933 other than the addition of the forced draft system and room thermostat control. Total tons—8 @ 5.80, $46.50.

1930-31 heating season was the start of forced draft with room thermostat control. Less tons used each year is due to better combustion and more exact control of fire through room temperature control. Total tons—6 @ 3.29, $19.75.

1931-32 heating season—Same system. Total tons—6½ @ 2.94, $19.11.

1932-33 heating season—Same system. Total tons—7¼ @ 2.53, $19.00.

Coal prices vary throughout heating season, and average is arrived at by dividing total fuel bill for the year by the tons used.

◆

Walsh Buys Brick Plant

The Walsh Refractories Corporation, 4428 North First Street, St. Louis, Missouri, announces the purchase of the plant and properties of the North Missouri Refractories Company, located at Vandalia, Mo.

The new plant has a capacity of 12,000,000 bricks.

PERFORATED SHEET METALS

ALUMINUM, Brass, Bronze, Copper, Steel, Zinc, Tin, Monel, etc. For Ventilators, Grills, Filters, Drainers, Screens, Strainers, Grain Sizing and Grading, Machine and Belt Guards, Conveyor Lining, Galvanizing Baskets, Drying Machinery and Coffee Roasters. Our 50 years' experience is your assurance of satisfaction. Send us your inquiries and let us quote on your requirements!

ERDLE PERFORATING CO., Rochester, N. Y.

ERDLE

YOUR PRICE WAS TOO HIGH!

Perhaps, but in most cases

You Just Did Not Have Enough Furnace For the Money

There may be a chance for you to hook up with

PEERLESS FURNACES

Write for brand new catalog and literature

Or better still, see them at the World's Fair, Chicago, General Exhibits Building

THE PEERLESS FOUNDRY CO.

INDIANAPOLIS, IND.

Complete specialized modern tools for chimney cleaning is only one feature of Super Furnace Cleaner supplied at no extra cost that enables the furnace man who owns a Super to do all or any part of a complete cleaning job at any time, and to buy a really complete cleaner with only one investment. Make us prove that Supers cost no more, but earn lots more. Write for data.

THE NATIONAL SUPER SERVICE COMPANY
1944 No. 13th Street, Toledo, Ohio

WHITNEY LEVER PUNCHES

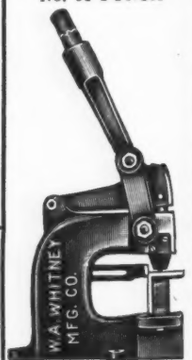
No. 4B PUNCH

Length—8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅛" to ⅜" by 64ths.

No. 6 PUNCH

Length — 26½ inches. Capacity — ¼-inch hole through ⅜-inch iron; especially adapted for button punching or templet work. Punches and dies ⅛" to ⅜" by 32nds.

No. 91 PUNCH

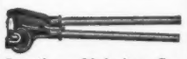


Capacity — ⅝-inch hole through ¼-inch, 1-inch hole through ⅜-inch and 2-inch hole through ¼-inch iron. Depth throat 5-inches. Weight — 82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.

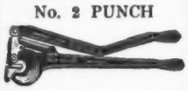
Ask your Jobber

No. 1 PUNCH



Length — 34 inches. Capacity — ⅝-inch hole through ¼-inch iron. Punches and dies in sizes from ⅛ to ⅜ by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to ½-inch by 64ths.

CHANNEL IRON PUNCH

Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

News Items . . . . . .

Change in Convention Headquarters

The June meeting—June 12 to 14 inclusive—of the National Warm Air Heating and Air Conditioning Association will be held in the Stevens Hotel and not in the Morrison Hotel, as previously announced, according to word received from Allen W. Williams, Managing Director.

Contractors and manufacturers intending to attend this convention should note the change in the convention hotel.

◆

Adolph Munkel Open Business

Adolph Munkel, one of the best known heating contractors in Central Ohio, announces that he has again resumed business under his own name—Munkel Heating Company—in his former location, 569 North Fourth Street, Columbus, Ohio.

Mr. Munkel is known to most of the manufacturers and contractors as one of the earliest and most progressive air conditioning dealers in the Middle West. He has to his credit many forced air installations dating back to the very beginnings of this type of work. He is also well known for the manufacture of gas attachments and for his long service with the Columbus and Ohio Associations.

Several of the former employees are returning to the business so that the new sales, engineering and mechanical forces will be much the same as in the past. The firm will act as installers and distributors of the Lennox, Pennsylvania and Lamneck line of cast, steel and gas furnaces.

◆

New Rudy Jobbers

Rudy Furnace Company announce the appointment of M. Braunwart & Co., 754 Straight Street, Cincinnati and the Cincinnati Sheet Metal & Roofing Co., Cincinnati, as distributors of the Rudy gravity and air conditioning furnaces, Rudy fans, gas furnaces and other air conditioning apparatus.

◆

Death of Samuel Harrison Sperry

Samuel Harrison Sperry, Secretary and Sales Manager of the Rock Island Stove Company, Rock Island, Ill., died Saturday, April 7. Mr. Sperry had been connected with the heating industry for several years. He is survived by his widow, two daughters, his parents, three brothers and two sisters. Mr. Sperry's father is President of the Rock Island Stove Company.

◆

New Moldings and Shapes Company

Mitchell Specialty Company of Holmesburg, Philadelphia, has recently installed modern rolling machines and is now engaged in the manufacture of a general line of metal mouldings and shapes, either in straight length or bent form and in a great variety of cross sections.

A. R. Evans, formerly with the Edward G. Budd Manufacturing Company, Philadelphia, is in charge of sales.

The company has for many years been a supplier of automotive standard equipment and has facilities and experience in a broad line of metal stampings and screw machine parts.

◆

Pranke Resumes Traveling for Keith

B. R. Pranke, who has been a traveling salesman for Keith Furnace Company for a good many years, has resumed his traveling for the company.

News Items . . . . . .

Contractor Wishes Catalogs

The Metal Specialty Company, 1802 Main Street, Green Bay, Wisconsin, would like to receive catalogs and prices on all lines of supplies in the warm air heating and sheet metal business. The company would also like to have full information on a competitive line of steel and cast furnaces.

◆

Ohio Convention Date

The 1934 annual convention of the Ohio State Association of Sheet Metal Contractors will be held in Columbus in July, according to A. E. Munkel, A. E. Bogen and William Lauer, members of the state convention committee. Full details of the program and the exact date of the meeting will be announced shortly.

◆

Contractor Wishes Circulars and Prices

The Grandview Sheet Metal Works, Ltd., 1739 Venables Street, Vancouver, B. C., Canada, would like to receive catalogs, circulars, price sheets and information from manufacturers of all types of air conditioning units.

The Grandview firm is also anxious to get information on a small induction fan with about two blades and perhaps three or four inches in diameter.

◆

Sibert Purchases Co-Operative Foundry

Henry Siebert Sons, Inc., Rochester, New York, announces the purchase of all patterns and the balance of stock of the Co-operative Foundry Company of Rochester, manufacturers of Red Cross stoves, Ajax, Empire and Bermuda furnaces.

The Siebert Company are prepared to give service on all parts for these stoves and furnaces.

◆

H. B. Huffaker Transferred to Omaha

H. B. Huffaker, who for three years was heating engineer for Dail Steel Products Company, located at the Dail Company plant at Lansing, Michigan, has been transferred to the company's Omaha territory and will have offices at 1111 Harney Street, Omaha.

Mr. Huffaker's territory includes the western tier of counties in Iowa as well as in Nebraska. He will offer an engineering and sales service to the dealers in his territory.

◆

Revere Appointments

Revere Copper and Brass Incorporated, has announced the appointments of R. H. Binns, Jr. and S. H. Wilson, as Assistant General Sales Managers, with headquarters in the General Sales Department, New York Central Building, New York City.

◆

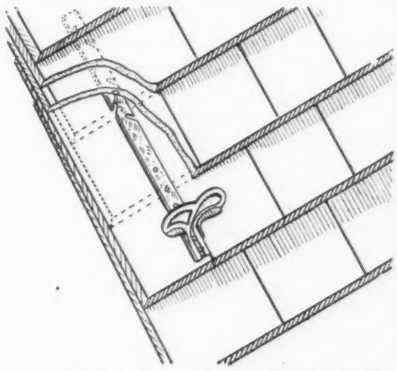
Death of Fred W. Hillman

Fred W. Hillman, who was a member of the firm of Tanner & Company for 54 years, died Tuesday, April 10, at the age of 69.

Mr. Hillman first joined Tanner & Company as a youth and served his entire business life in the service of this company. Beginning as a bill clerk he successively acted as shipping clerk, stock clerk, and at the time of his death was in complete charge of all stock for the firm.

SOMETHING NEW!

SNOW GUARD FOR OLD ROOFS



No. 100—B. B. Snow Guard (Pat. Applied For)

This guard was principally designed for use on old roofs, but is equally as effective on new work.

On new work, it is applied the same as other guards with plates. On roofs where the slate or shingles are already on, the operation is very simple—simply slide the slotted plate up under the slate or shingle; engage a nail, holding the slate or shingle in one of the convenient slots, pull the guard down slightly to take the benefit of the full length of the slot—nothing else to do.

ENDORSED BY PROMINENT SLATERS

Made of heavy stamped steel, hot galvanized after forming and solid copper. Unusual strength—ease of application—ornamental. Does not require removing of slate or shingles—no danger of breaking the slate or shingles in applying. Snow guards protect gutters, shrubbery and human life.

Order from your jobber

BERGER BROS. CO.

229-237 ARCH ST. PHILADELPHIA, PA.

16TH AND GROVE STS., JERSEY CITY, N. J.

FAULTLESS HEATER CORPORATION

Continues the manufacture of the former Graff Furnace Company's

FAULTLESS FURNACES

and

FURNACE REPAIR PARTS

(From the Original Patterns)

for

FAULTLESS — COMFORT
FAULTLESS-COMFORT — CAPITAL
LACKAWANNA — PHILADELPHIA

and other Graff furnaces

Among the Supply Houses carrying a stock of these Repair Parts made from our original patterns are the following:—

New York, N. Y. ..... FAULTLESS RANGE & MFG. CO.
Washington, D. C. ..... FRIES, BEALL & SHARP CO.
Philadelphia, Pa. ..... AETNA STOVE CO., INC.
Philadelphia, Pa. ..... STANDARD STOVE REPAIR CO.
Philadelphia, Pa. ..... UNITED STOVE REPAIR CO.
Philadelphia, Pa. ..... WEINSTEIN SUPPLY CO.
Philadelphia, Pa. ..... M. STEIN
Milwaukee, Wis. ..... THE SPEICH COMPANY
Pittsburgh, Pa. ..... THE GRAFF COMPANY
Pittsburgh, Pa. ..... SHAMBLEN FURNACE PARTS CO.
Allentown, Pa. ..... PENNSYLVANIA SUPPLY & MFG. CO.
Rochester, N. Y. ..... HENRY SIEBERT SONS, INC.
Chicago, Ill. ..... ASSOCIATED HEATER PARTS CO.
Wilkes Barre, Pa. ..... WHITE HARDWARE CO.
Youngstown, Ohio ..... BANNER REPAIR PARTS CO.
Scranton, Pa. ..... SAMUEL WEINBERG & SONS
Shamokin, Pa. ..... GEO. B. KEISER
West Pittston, Pa. ..... THOS. R. DAVIS CO.
Newark, N. J. ..... ESELGROTH & CO.
Baltimore, Md. ..... S. G. KUGLER CO.
Baltimore, Md. ..... GEO. J. THALER, INC.
Boston, Mass. ..... HUSE & CARLETON, INC.

These Supply Houses can give you prompt service

FAULTLESS HEATER CORPORATION

CLEVELAND OHIO

Today, Business Is Made with
BRIGHT, TARNISH-RESISTING METAL
Use APOLLO *Sheets for lasting Satisfaction*

APOLLO ChromCopper
For
Table Tops
Drain Boards
Shelf Covering
Steam Tables
Bars and Novelty Boxes

APOLLO ChromTin
For
Stove Pipe
Collars
Elbows

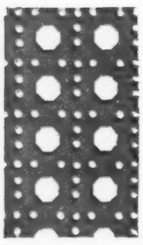
APOLLO ChromZinc
For
Range Hoods
Reflectors
Decorative Effects

APOLLO Sheets are standardized for immediate shipment from jobbers' warehouses. Write us for reference to jobber in your territory who guarantees to supply APOLLO Metals.

Apollo ... for QUALITY and SERVICE

APOLLO COMPANY
BOX AA LA SALLE, ILL.
See page 18, Annual Directory Number, for full particulars regarding all APOLLO-Pre-Finished Metals.

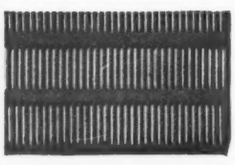
PERFORATED METALS



Screens for Grains, Minerals, Food Products or any material to be graded or screened.

Safety Guard Accessories, including perforated sheets, angles, bands, etc.

Architectural Grilles in many designs. Special patterns and sizes to suit your individual requirements.



Stainless Steel—Brass—Bronze—Copper—Monel—Aluminum—Zinc—or any other metal or sheet material perforated as wanted.

The Harrington & King PERFORATING Co.
5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

News Items . . . . . .

Butler Furnace Co. Incorporates

The Butler Furnace Co., and the Ramey Manufacturing Co., 243 North Fifth Street, Columbus, Ohio, who have been operating together for a number of years announce that the Butler firm, which has not been incorporated, has now incorporated.

The Ramey Mfg. Co., does no retailing, but is a manufacturer and jobber only. The Butler company will be retail only and will not wholesale.

The officers of the Ramey Mfg. Co. are—
L. S. McKnight, Pres. and Treas.
G. M. Schoot, Vice-pres. and Sec.
Helen Maxwell, Asst. Treas.

The officers of the Butler company are—
M. M. Swepston, Pres. and Treas.
F. C. Schott, Vice-pres. and Sec.

The two companies operate from the same office and factory, but their dealings are entirely separate.

◆

"AFCO" Celebrates 35th Anniversary

American Furnace Company, St. Louis, is this year celebrating its thirty-fifth anniversary.

A finely appointed show room measuring 14 feet by 28 feet has been installed in the east front portion of the main office and factory building located at 2729 Delmar Blvd. It has a mosaic tile floor, sand finish, plastered walls and wood trim, decorated in a harmonious color scheme. The newest in modern indirect lighting fixtures complete the appointments. The business offices have also undergone extensive alterations to provide additional space for a growing volume of business. They have been completely redecorated and refitted in harmony with the new showroom.

Plant facilities have also been modernized and include the replacement of wood floors with concrete, the establishment of a spacious parts storage department and the installation of new manufacturing equipment for volume production of the new "AFCO Air-Steam" Unit, an Air Conditioning Heating and Cooling System for homes.

The new Air Stream Unit which the company is featuring, is the result of several years intensive research and practical experimenting, to make this type of system available to even the most modest dwelling. It provides automatic heating and cooling and can be had for any one of the three familiar types of fuel: coal, gas or oil.

The officers of the company are all well known in heating circles. Harry V. Bayse is President, James Quinn, Vice-President, and Clarence S. Franke, Secretary-Treasurer.

◆

Electrical Appliance Sales for 1933

Unit sales of electric appliances in 1933 were larger than for the previous three years, and dollar sales exceeded the previous year for the first time since 1929, according to the annual review and forecast by "Electrical Merchandising."

35,000 cookers were sold, representing $313,250 retail value. Almost 165,000 hot plates, stoves and grills totaled $411,000. Oil burners had a total sale of about 67,000 units at an installed value, including tanks and accessory equipment, of 25,500,000. 50,000 regular electric ranges were sold with a retail value of $7,100,000. Washing machine sales are claimed to be 1,000,000 for $55,000,000. It is considered remarkable that this number of washing machines was sold in 1933, bringing the saturation up to 42 per cent. Refrigerators rolled up the impressive total of 1,050,000 units, valued at $175,277,000. The refrigerator total surpassed the previous peak, made in 1931, by a comfortable margin and 1934 estimates range from 1,250,000 up.

New Literature . . . .

Air Conditioning Booklet

A new booklet entitled "Air Conditioning Brings Health and Comfort to the Home," has been issued recently by Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

The text deals with the application of the Westinghouse air conditioning units to residences, stores, offices and all types of commercial establishments. The booklet is designed primarily for popular consumption and is written so that the home owner or business man can understand the advantages and general principles of air conditioning.

Excellent illustrations are carried throughout the book. A section of the booklet covers the various types of apparatus which the company produces with illustrations and explanations of the design, installation and operation of the apparatus.

Copies of the booklet may be obtained by writing the Westinghouse Company.

◆

Chrome Metal Leaflet

A leaflet dealing with decorative chromium metal of the fluted design has been prepared by American Nickeloid Company, Peru, Illinois.

This particular metal is recommended especially for decorative purposes and the leaflet explains how the material meets the particular requirements of interior trim and decoration. Copies may be obtained from the company.

◆

Penn Control System Leaflet

Penn Electric Switch Co., Des Moines, Iowa, has brought out a new booklet describing and explaining the operation of the company's new control system.

This system combines the feature of time and room temperature control. The instruments are so mounted that control of the heating element and blower are maintained to a close degree on both a high day and a low night setting. The instruments are designed for application at the baseboard to eliminate cold floors and stratification.

The booklet describes the instruments used and by charts and explanations tells just how the system operates. Typical time recording charts of the system as compared to charts for other systems are included in the booklet. Suggestions for locating the instruments and arranging their settings are also given.

Contractors interested in the latest developments in control apparatus and operation may obtain a copy of this booklet by writing the Penn Company.

◆

Republic Galvannealed Sheets

A new folder explaining the metallurgical reasons for the excellent adherence of zinc coating to Republic Galvannealed sheets and containing information on characteristics of these sheets has been published by Republic Steel Corporation, Youngstown, Ohio. Microscopic photographs of zinc coatings on sheets as well as illustrations of items of equipment such as dishwashers, cabinets, ranges, for which these sheets can be used, are contained in the leaflet.

The leaflet explains the manufacture of sheets and the process of applying the coatings. In addition, a table of gauges and sizes is given for the standard sheets, also extra sizes and gauges.

A copy of the leaflet may be obtained by writing the company.

Paint the sheet metal roofs in your territory with Thompson's "370 SPECIAL RED" — it will do a job which will be completely satisfactory to your customers and which will put real money into your pockets.

Thompson's "370 SPECIAL RED" is a heavy bodied Red Oxide Paint especially designed for Tinners and Roofers and offers positive protection to all metal surfaces, especially those exposed to the elements.

Pure Red Lead, Spanish Sesqui-Oxide of Iron and highest grade Raw and Boiled Linseed Oil combine to make "370 SPECIAL RED" a paint which has extraordinary powers in resisting rust and corrosion.

"370 SPECIAL RED" is not just another paint, but a paint which gives you something to talk about to your customer—a fact which will go a long way toward getting the business for you.

Other Thompson Products are Alumbrite, the new Aluminum Paint for Wood and Steel and Lin-O-Jap, the Perfect Reducing Oil for All Paint.

THOMPSON & COMPANY
P. O. BOX 557, N. S. PITTSBURGH, PA.

"370 SPECIAL RED"
positive protection for Sheet Metal Roofs

Sell the
BRUNETT PATENTED HEAT UTILIZER
The latest improvement in fuel saving—
Will Increase Your
. . . SALES
. . . PROFIT
and Will Save Your Customers 25 to 50%
of Their Fuel Costs
WRITE TODAY FOR DETAILED INFORMATION
BROWN SHEET IRON & STEEL COMPANY
Pioneer Welders of the Northwest
964 BERRY AVE. Nestor 7137 SAINT PAUL, MINNESOTA

Incomparable Vacuum Furnace Cleaner
—handles job without babying. PORTABLE—weighs only 54 pounds—can be carried or wheeled about. COMPACT—room in the family car without crowding—for three men — tools — and machine.
Free Trial — Terms —and a Book that Tells You How.
Write for details
Grand Rapids Furnace Cleaner Co.
Grand Rapids, Mich.

"What'll you have?— this one's on the house"

FREE SAMPLE
RUBYFLUID PRODUCTS

☐ ACID CORE SOLDER ☐
☐ ROSIN CORE SOLDER ☐
☐ LIQUID FLUX ☐
☐ SOLDERING PASTE ☐

Make Request on Your Letterhead

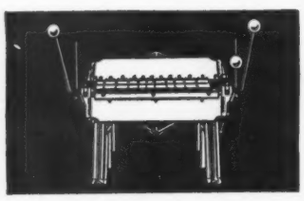
THE RUBY CHEMICAL CO.
Columbus 74 McDowell St. Ohio

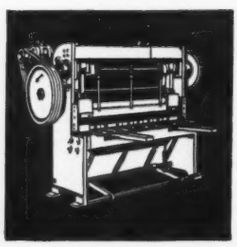
Install ÆOLUS *Improved* VENTILATORS

FOR industrial buildings, schools, homes, theaters, etc. Made in 14 different metals. Constant ventilation—no noise —no upkeep.

ÆOLUS DICKINSON
Industrial Division of Paul Dickinson, Inc.
3332-52 South Artesian Avenue
Chicago, Ill.

CHICAGO





Box and Pan Brake Power Squaring Shear

STEEL BRAKES—PRESSES—SHEARS

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

ALL ON ONE ORDER TO BRAUER
Any REPAIRS FOR STOVES BOILERS and FURNACES
A.G. BRAUER SUPPLY CO. SAINT LOUIS
ALL IN ONE SHIPMENT TO YOU

New Literature . . . .

Discount Sheets

A series of three discount sheets covering manufacturers; gas companies, jobbers and brokers; and retail heating contractors; has been prepared by the Barker Gas Burner Co., 3702 Superior Avenue, Cleveland, Ohio. These discount sheets cover the company's line of jet burner units, gas pressure regulators and accessories.

Each leaflet gives full information on quantity and time discounts.

Readers wishing these discount sheets should address their letter to The Barber Gas Burner Co. on firm stationery.

◆

Air Conditioning Leaflet

A new leaflet on the general subject of air conditioning and what it means and taking up in detail the seven points of: cleaning, circulation, ventilation, heating, humidification, cooling, and dehumidification, has been produced by Electrol Incorporated, 934 Main Avenue, Clifton, New Jersey.

The text in the leaflet goes into considerable detail on the general subject of air conditioning, its why's and wherefore's and advantages. Discussion of the benefits of air conditioning are tied into a discussion of how these desirable conditions can be bettered by using the apparatus manufactured by this company.

Descriptions of the apparatus and a general method of operation for the system is also contained in the leaflet. The leaflet is accompanied by a design sheet which shows suggested methods of hooking up the apparatus for winter and summer conditioning. This design leaflet contains an explanation of the amount of conditioning to be obtained from the various pieces of apparatus, gives full specification on sizes and capacities of the units, covers such engineering details as velocities, register air temperatures, duct sizing and the principles of cooling and dehumidification. Some specifications for refrigeration machinery are also given.

Copies of the leaflet may be obtained from Electrol, Incorporated.

◆

Bright Metal Leaflet

The Apollo Metal Works, LaSalle, Illinois, manufacturers of "Chromflex," a new material for display and fabricating purposes, have prepared a small leaflet describing this interesting line of sheet material.

"Chromflex" is offered in flat, fluted, crimped, striped sheets; also flat sheets on plywood, angles and mouldings. Finishes can be either polished or satin. A small sample of the crimped finish is mailed with the leaflet to aid contractors in seeing just how this new product appears.

The company suggests that this material, designed especially for display purposes, can be sold by contractors to retail establishments for a large number of various kinds of displays. Some suggested displays are contained in the leaflet.

Readers desiring a copy should write to the company.

◆

Iron Leader Shoes & Boots

A leaflet and price sheet for iron leader shoes and boots will be mailed to contractors by O. S. Stewart, 887 East 67th Street, Cleveland, Ohio. The leaflet gives the various sizes of boots and shoes for standard sizes of down spout. The price sheet gives the price per foot for these same standard sizes.

New Literature . . . . . .

Cleaning Leaflet

An unusual leaflet dealing with the general subject of the advantages of furnace cleaning has been prepared by the National Super Service Co., 1946 North 13th Street, Toledo, Ohio.

The title of this booklet is "Don't Wait for the Fire Department."

As its title signifies, the booklet deals with the problem of fire hazard due to soot in smoke pipes and chimneys. Records of fires originating from these sources are contained in the leaflet. An explanation is also given of a quick and easy method of determining whether or not soot is present and the text explains just how this coating of soot forms a fire hazard.

These leaflets are intended for contractor distribution and are sold by the National Super Service Company with the dealer's imprint. Full information on prices in quantities may be obtained by writing the company.

◆

Blower Bulletin

A new air conditioning blower bulletin is announced by Air Controls, Inc., Division of the Cleveland Heater Co., 1960 West 114th Street, Cleveland, Ohio.

The bulletin, No. 16, gives full explanation of the design of the blower, a schedule of prices for the various sizes, a simplified selector chart to enable the contractor to use the correct type of blower for the particular requirements of the job. A table of static resistances is also included. Specifications of the blower include all dimensions and ratings and full performance data for static pressures from ⅛ to ½-inch are included. Contractors may secure a copy of the bulletin by writing Air Controls, Inc.

◆

Enduro Stainless Steel Booklet

An elaborately illustrated booklet covering the application of Enduro 18-8 types of stainless steel will be mailed to contractors by Republic Steel Corporation, Massillon, Ohio.

The booklet takes up in sequence a discussion of Enduro, its properties and characteristics; the reaction of the material at high temperatures; proper methods of annealing, removing scale, deep drawing, punching, shearing, riveting, welding, soldering and brazing; a section devoted to explaining the various types of this stainless steel; and tabulations of temperature data and resistance to various types of acids, vapors, liquids, etc.

The text material is prepared for ready reading and reference and furnishes an excellent outline of the various fabricating processes which may be used on this material.

◆

Fire Pot and Tool Catalog

The Otto Bernz Co., Inc., 280 Lyell Avenue, Rochester, N. Y., have completed their new catalog No. 65, describing the company's complete line of "Aways Reliable" torches, fire pots and mechanics' tools.

The catalog covers in detail, by explanation and illustration, the various sizes and kinds of gasoline and kerosene torches, sprayers and fire pots. In addition, the company's hand tools such as files, chisels, caulking irons, brushes, cleaning tools, coppers, etc., are included in the catalog.

Readers may obtain a copy by writing to the company.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

Write for Journal and Stock List

JOSEPH T. RYERSON & SON INC

CHICAGO DETROIT MILWAUKEE ST. LOUIS JERSEY CITY CINCINNATI BUFFALO CLEVELAND PHILADELPHIA BOSTON

SHEETS

"Talk About Profitable Repair Orders and Cleaning Profits with the TORNADO Furnace and Boiler Cleaner

"My TORNADO Furnace & Boiler Cleaner has brought me more profitable repair and replacement business than I have had in years in addition to hundreds of dollars profit on the cleaning. In our 35 years in business it is the most profitable investment we have ever made." So says the General Repair and Equipment Co., Elizabeth, N. J.

Hundreds of other TORNADO users are also cashing in on the splendid profits to be made with the TORNADO. You too can earn real money with the TORNADO. Send in at once for complete details and p.o for the facts proving Breuer's TORNADO to be a superior cleaner with the most complete tools (chimney cleaner if desired)—No obligation—Write us TODAY for free trial offer.

Breuer Electric Mfg. Co.
865 Blackhawk Street, Chicago, Ill.

SCHWAB GILTEDGE FURNACES

We are successors to
R. J. Schwab & Sons Co.
in the manufacture and sale of all
GILTEDGE Furnaces and Repairs

For original GILTEDGE Furnaces and for Furnace Repairs for GILTEDGE, SCHWAB and SERCOMB Furnaces order from

NRA MEMBER U.S. WE DO OUR PART

SCHWAB FURNACE & MFG. CO.
Sales Offices: 522 West Cherry St.
Milwaukee Wisconsin
Factory and General Offices
Cedar Grove, Wisconsin

HOTEL LENOX

Business Men—Tourists—World Travelers—
All come back to the Lenox. Famous for good food, homelike comforts, perfect service.

LOW RATES
Single, $1.50 to $3.00
Double, $2.50 to $5.00
Family Suites, $6.00 up

Send for Free AAA Map and Booklet

CLARENCE A. MINER, President
140 North St., near Delaware

BUFFALO, N. Y.

PLATTE OVERTON
will design 3 plans for you for $18.00

Now is the time to go after that prospect for air conditioning that put you off last Fall. Cinch this job by presenting them with a neat and comprehensive blueprint of the completely designed system. This blueprint is your silent salesman. He is on the job every minute. Your competitor must talk against your plan.

Send in your sketches and your check for $18.00 and you will be mailed blueprints of the complete system within 48 hours.

This payment of $18.00 entitles you to 2 more plans at any time during the months of June or July.

This special offer is good until June 1st, 1934.

PLATTE OVERTON
5236 West Huron St., Chicago, Illinois

THE FINEST LOCATION IN
St. Louis

The advantages of a splendid central location; the prestige of a renowned address; the luxuries of a truly fine hotel—all these, and more, are yours when you select the Melbourne Hotel as your St. Louis headquarters.

400 ROOMS WITH BATH
FROM $2.50 SINGLE

Splendid food in Dining Room and Coffee Shop. Garage in Connection...
O. P. GREATHOUSE, *Manager*

Melbourne Hotel
LINDELL BOULEVARD AT GRAND AVENUE

DeWITT OPERATED HOTELS

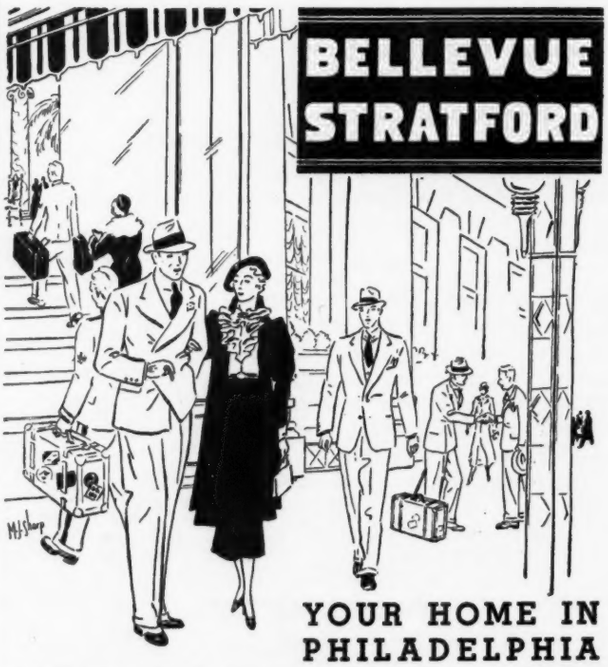
feature: UNUSUALLY COMFORTABLE ROOMS. THE FINEST OF FOODS AND RATES STARTING AT $2.50 SINGLE. $4.00 DOUBLE

In Cleveland it's
The HOLLENDEN
1050 ROOMS ALL WITH BATH
RADIO IN EVERY ROOM

In Columbus it's
The NEIL HOUSE
650 ROOMS. ALL WITH BATH

In Akron it's
The MAYFLOWER
450 ROOMS. ALL WITH BATH
RADIO IN EVERY ROOM

In Miami Beach it's
The FLEETWOOD
AN EXCLUSIVE WINTER RESORT HOTEL
OPERATING EUROPEAN PLAN



BELLEVUE STRATFORD

YOUR HOME IN PHILADELPHIA

A hotel that lives up to its fine traditions . . . an unhurried hospitality reminiscent of an Older Philadelphia, and its charm . . . a cuisine that bespeaks the wizardry of world-famed chefs . . . plus every modern, thoughtful regard for your comfort, convenience and pleasure . . . all at most reasonable rates.

Claude H. Bennett, *General Manager*

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. One inch $3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date.

SITUATIONS OPEN

WANTED—A RETAIL FURNACE SALESman with knowledge of air conditioning and Standard Code. Must be able to figure plans and have some executive ability. To the right man there is an opportunity to become sales manager of the organization. Give complete experience and references in first letter Address Lusch Furnace Company, 800 Chambers Road, Columbus, Ohio.

WARM AIR HEATING SALESMAN—MANufacturer wants men in several territories. Must be capable of residential Air Conditioning sales. Reasonable drawing account to established and proven men. Address Key 278, "American Artisan," 6 North Michigan Ave., Chicago, Ill.

EXPERIENCED TRAVELING SALESMAN wanted. Must be experienced in forced air and gravity heating. Address Key 277, "American Artisan," 6 North Michigan Ave., Chicago, Ill.

WANTED: MANUFACTURERS' AGENTS or Sales Engineers with forced air heating and air conditioning experience to handle a definite territory on commission basis on a line of equipment which is showing increased sales. Repeat orders indicating customer satisfaction. Give complete experiences and references in first letter. Address Key 273, "American Artisan," 6 North Michigan Ave., Chicago, Illinois.

FOR SALE

FOR SALE—ACCOUNT OWNER'S DEATH must sacrifice well established, equipped and stocked sheet metal and roofing shop. Business as usual. Acme Sheet Metal Works, 2159 Fifth Avenue South, Petersburg, Fla.

FOR SALE—COMPLETE SHEET METAL and furnace shop. Rent reasonable. Box 465, New Philadelphia, Ohio.

MANUFACTURE YOUR OWN TINNING Compound that tins all metals—also Combination Welding and Brazing Flux. Save Money—Buy Fisher's Guaranteed Formulas—$5.00 each. Tinning Compound—$1.75 lb. Combination Welding and Brazing Flux—$1.25 lb. F & W Manufacturing Company, 1411 Davenport Street, Omaha, Neb.

FOR SALE

Newton Hickory Mallets

Designed for metal workers

Balanced and can be used without wrist strain

●

Cortland Hickory Handles

All sizes and weights

●

Send for complete price list

WARREN HANDLE WORKS

CORTLAND, OHIO

FOR SALE

SHEET METAL WORKING MACHINERY AND TOOLS

●

Rebuilt - Trade - In Machinery

●

Angle Iron Cutters	**Grinders**
Beading Machines	**Punches**
Bending Brakes	**Shears**
Bar Folders	**Turners**
Groovers	**Rollers**

Write for Stock List

MAPLEWOOD MACHINERY CO., Inc.
2634 Fullerton Avenue, Chicago, Ill.

FOR SALE: HOT DIP TINNING EQUIPment for milk and cream cans, refrigerator parts, etc. Write for prices on Hot Dip Tinning, also prices on our well known Super Re-Tinning and Soldering Flux. Retinning Mfg. Co., 3021 Greenview Avenue, Chicago. Phone Buckingham 7250.

MACHINES-TOOLS-SUPPLIES for

SHEET METALS

Have you seen the new

CHICAGO STEEL FOLDER BRAKE?

Lengths, 36'—42' **Capacity 20 Ga.**

Will bend heavier metal than a folder. Will bend channel bends smaller than a brake.

Investigate this machine!

Prices and details sent on request.

WARD MACHINERY CO.
564 W. Washington Blvd., Chicago, Illinois

FOR SALE: CHICAGO POWER ELBOW Machine and Bookkeeper's desk with high chair. Address Teela-Zentner, Oshkosh, Wisconsin.

FOR SALE

BLAST GATES

Write for Price List. Standard Sizes Carried in Stock for Immediate Shipment.

ALFRED GOETHEL
1910 N. Killian Pl., Milwaukee, Wis.

BALL JOINTS

SITUATIONS WANTED

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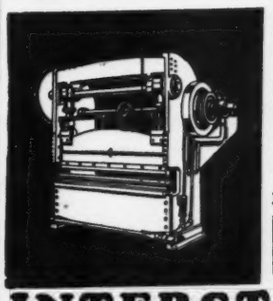

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THIS illustration shows why Granite City Steel gives you that extra flatness so desirable in your fabricating operations. This special testing truck is a positive check for flatness. It was originally used on jobs where specifications required a degree of flatness unnecessary in ordinary fabricating work. Its use has so influenced production practice at the mill that all Granite City commercial sheets provide unusual freedom from "waves"—insuring the kind of work that adds extra quality to your finished job.

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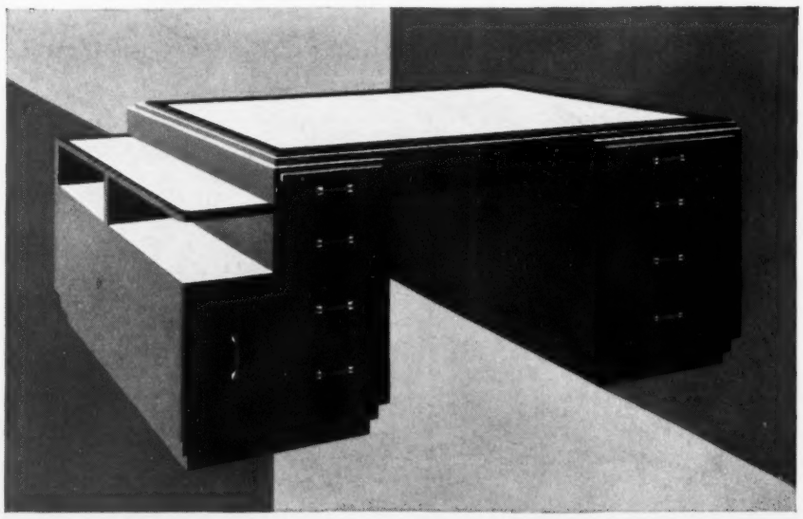

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TO REALIZE to the fullest extent the beauty of new designs, choose your material carefully. Consider the experience behind it, and the equipment on which it is produced, as well as its grade and specifications.

To produce the quality of steel desired without variation — three things are vital: raw materials exactly right, rolling equipment incorporating all the refinements science has provided, and an organization experienced in getting the most out of the equipment and material.

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Inland sheet and strip rolling equipment is up to the minute. It helps skilled steel men realize new levels of quality and uniformity.

Inland guards raw material quality by controlling adequate supplies of the highest grade materials for each specific purpose.

Apply the results of Inland equipment, experience, and controlled quality in working out your ideals of beauty for your product by standardizing on Inland Steel Sheets. Made in all grades of Hot Rolled and Cold Rolled High Finished Sheets. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago, Illinois.

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